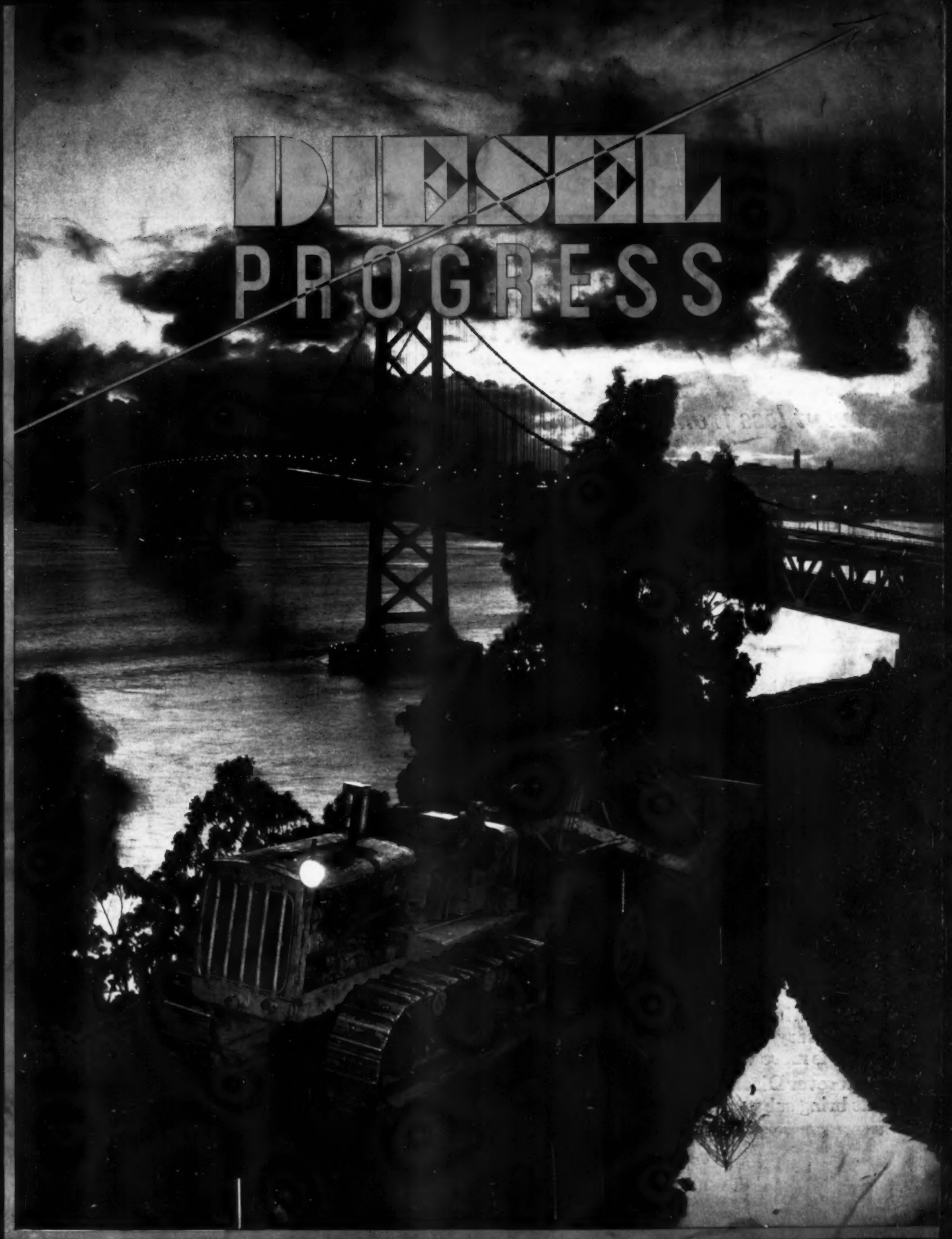
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



MAY, 1938 CIRCULATION OF THIS ISSUE — IN EXCESS OF 14,000 COPIES 25c

Correct Lubrication

***SOCONY-VACUUM** helps Diesel operators save on engine wear... prevent loss from blow-by...increase time between draining periods...*

HELPS LOWER DIESEL OPERATING COSTS...

TODAY—with operating economies increasingly necessary—Correct Lubrication of your Diesel engines is more vitally important than ever!

Wherever Diesel power is used, Gargoyle Lubricants bring substantial savings. Engines retain initial efficiency for longer periods due to low wear rate and freedom from deposit.

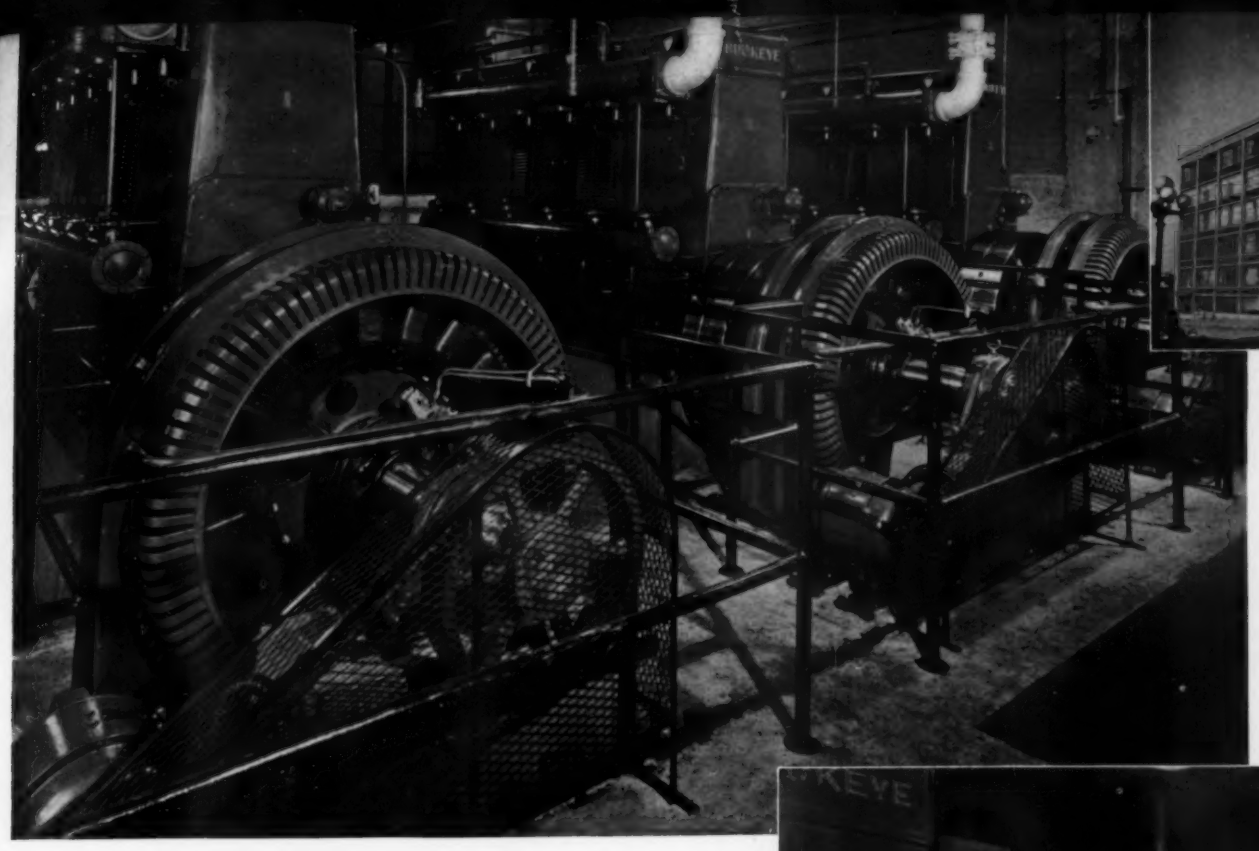
The Socony-Vacuum Representative can help your men get greater efficiency from your Diesel engines. Ask him about Correct Lubrication.

SOCONY-VACUUM OIL CO., INC.

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · MAGNOLIA PETROLEUM COMPANY
CHICAGO DIVISION · WHITE EAGLE DIVISION · WADHAMS OIL COMPANY · GENERAL PETROLEUM CORPORATION OF CALIFORNIA

GARGOYLE Lubricants

MAKERS OF
MOBILGAS
MOBILOIL
GARGOYLE
INDUSTRIAL
LUBRICANTS



These three illustrations show the main factory, The Julian & Kokenge Co., Columbus, Ohio; the generator ends of the three 225 hp. Buckeye Diesels and the control ends of the same three engines which save this company over $500.00 per month.

BUCKEYE DIESELS

Cut power bill in half for the Julian & Kokenge Company, Shoe Manufacturers, Columbus, Ohio

Install a
BUCKEYE DIESEL
and Save
40% to 70%
on Power!

The BUCKEYE Diesel is most economical and efficient because of seven features:

1. **Silent Watchman (Pat.)**
2. **Full pressure lubricating system.**
3. **Sleeve cylinders.**
4. **Exhaust and intake manifolds not bolted to cylinder head.**
5. **Reversible shell type silver alloy bearings.**
6. **Individual pumps for each cylinder.**
7. **Completely enclosed.**

Sizes: 40 H.P. to 600 H.P.

A BUCKEYE DIESEL CAN SAVE FOR YOU TOO!

THE three 225 hp. Buckeye Diesel Engines installed last June by the Julian & Kokenge Co. are operating so efficiently, so economically that they have cut the previous power cost in half. See descriptive article describing this installation on pages 28 and 29 of this issue.

What Buckeye Diesels have done for this well-known shoe manufacturer they can do for you—radically reduce your power costs. Write for complete information. Use Quickmail Coupon No. 3.

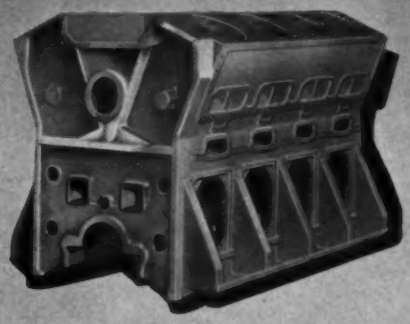
***Be* PROFITWISE *and* DIESELIZE *with* BUCKEYES**

ENGINE BUILDERS SINCE 1908

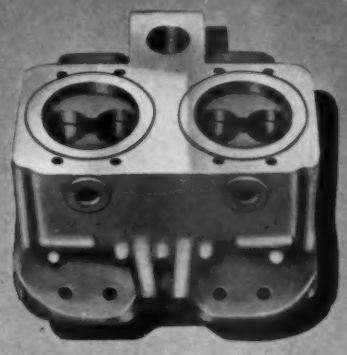
The BUCKEYE Machine Co., LIMA, OHIO

DIESEL PROGRESS for May, 1938. Volume IV. No. 5. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at Brooklyn, New York, authorized May 14, 1935. Subscription rates: United States and Possessions $3.00, Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

A 600-pound PISTON



A 7500-pound CYLINDER BLOCK and FRAME



A CYLINDER HEAD for Two Cylinders

A FRAME-BEDPLATE for a 300 h.p. Marine Engine

A BLOWER HOUSING for a 1200 h.p. Engine

YOU'LL FIND THIS TRUE

where Aluminum is used in Diesel Engine Construction

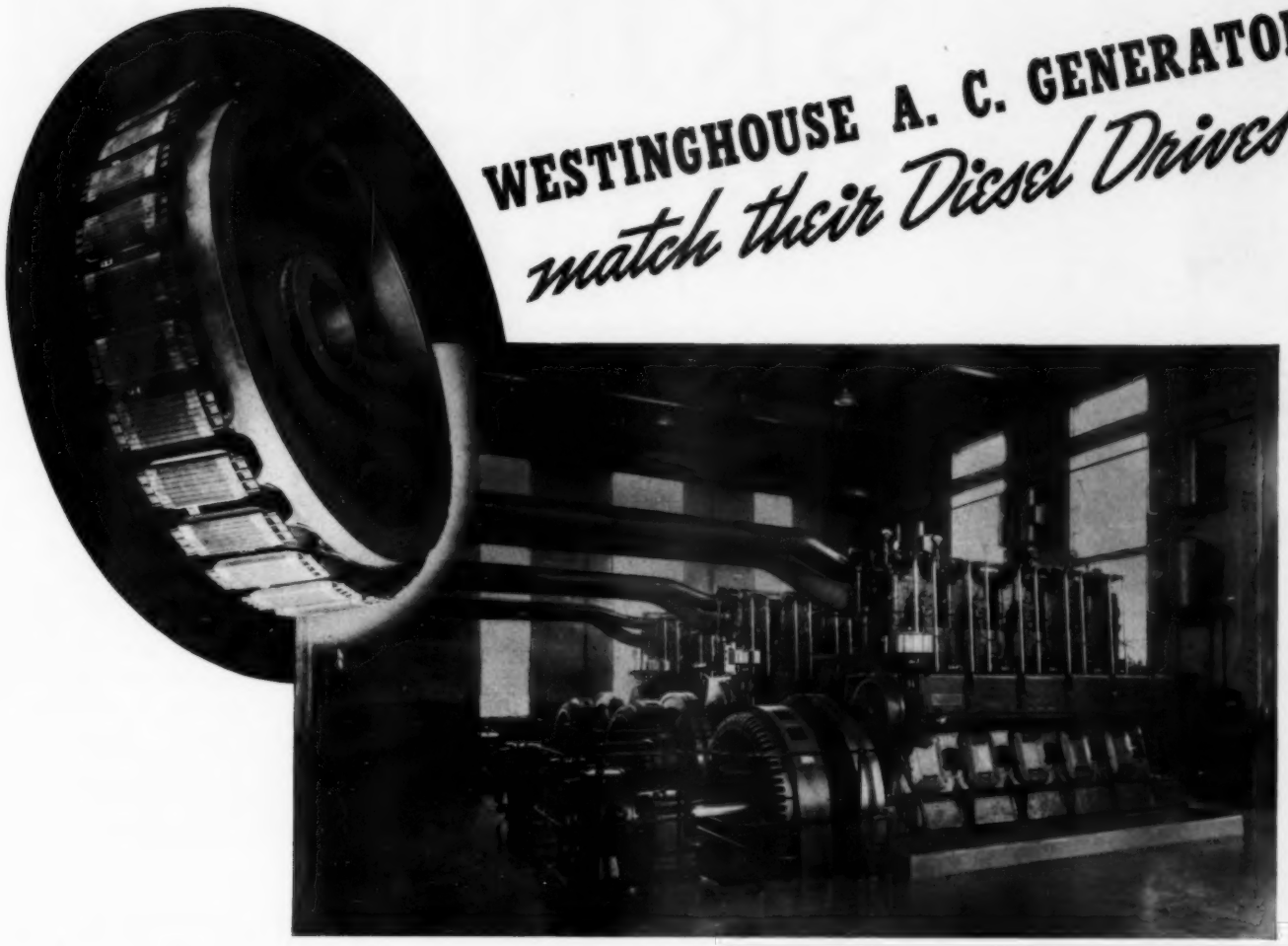
You'll find that engines using Aluminum for the moving parts — pistons, connecting rods, crankpin boxes, and valve gear mechanism — are more compact and deliver more horsepower per pound of weight than with heavier metals. The high thermal conductivity of Aluminum and its inherent lightness keep thermal stresses and bearing pressures within conservative limits. Engine ratings are increased, at low cost, with assurance of continued reliable operation.

You'll find *no more economical way of saving weight* in Diesel engine construction than through the use of Alcoa Aluminum Alloys for such parts as cylinder blocks, frames, bedplates, cylinder heads, blower housings and covers. Savings as high as 60% on the weight of these parts are possible. Years of trouble-free operation have proved the reliability of Aluminum construction.

Alcoa engineers are helping Diesel manufacturers on their weight-saving problems. Feel free to ask them what it will cost to save weight on your engine. ALUMINUM COMPANY OF AMERICA, 2141 Gulf Building, Pittsburgh, Pa.

ALCOA · ALUMINUM

WESTINGHOUSE A. C. GENERATORS *match their Diesel Drives!*



WESTINGHOUSE A.C. Generators are individually tailored for the Diesel engines to drive them. That's why operators speak so highly of their performance; excellent electrical efficiency, long life with a minimum of maintenance. Here's a sample of the "matching" done in designing one of these generators.

The rotor for a Westinghouse Generator is fabricated from structural steel, formed and welded to the finished shape. Where no separate flywheel is used, the mass of metal is varied to give rotating characteristics suited to those of the Diesel engine. There's no approximating these requirements; the rotor meets them *exactly*. Further adding to dependability, a rotor made this way, of structural steel, is better able to withstand the pulsating torques that are inherent in a Diesel engine's operation.

GET THIS NEW BOOK

"A.C. GENERATORS FOR DIESEL ENGINE DRIVE" describes this equipment in detail, and pictures applications with many different makes of Diesel engines. Write today for a free copy of this booklet. Use Quickmail coupon 9.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PENNA.

J 10072

WESTINGHOUSE ELECTRIC

Westinghouse A·C GENERATORS *for Diesel Engine Drive*

SWITCHGEAR · VOLTAGE REGULATORS · EXCITERS · AUXILIARY MOTORS · AUTOMATIC CONTROL

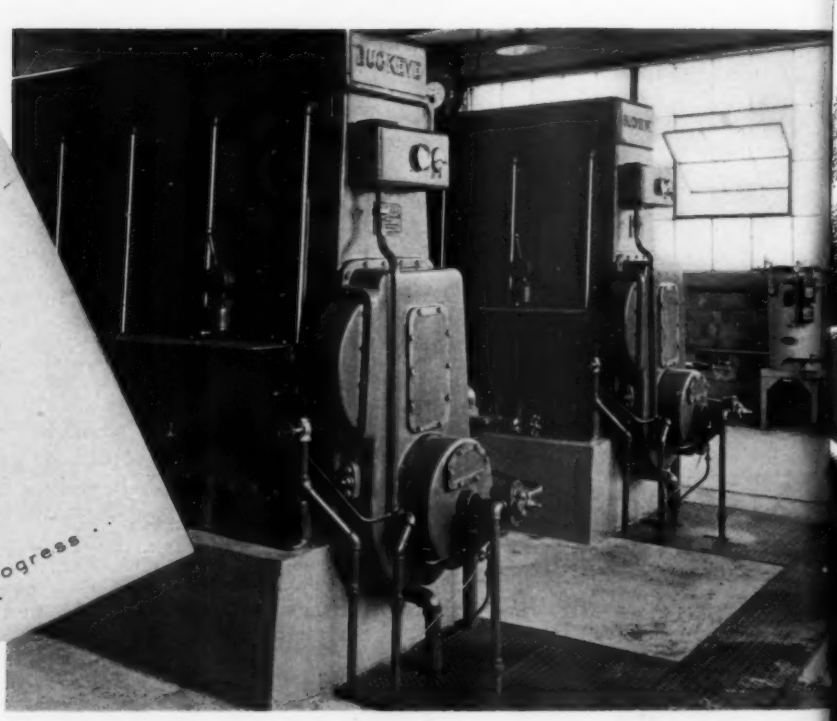
The JULIAN & KOKENGE
FINE SHOES FOR YOUNG
Mr. M. I. Iles.
Columbus, O.
331 Woodland
Avenue.
Dear Sir:
This is in reply to your
of June
15th. asking our frank opinion of the merits of the
Skinner Stream Line Filter recently purchased from
you, for use in our Diesel plant.
As you know, we are operating 3 Buckeye
Diesels, and at your suggestion, we installed the
filter at the same time we put the engines into op-
eration, with this result, the engines are perfectly
clean, and the 150 gallons of lubricating oil in cir-
culation, can not be detected from new oil, as to body,
color and original specification.
We confidently expect this filter to
pay for its self the first year, by eliminating
draining the engines and filling with new oil, and
what is more important, keeping the pistons and rings
free from sludge deposit, which insures against any
pistons sticking. We expect to use this original oil
indefinitely, and add new oil as needed to maintain the
volume.
We blow the filter once in 24 hours, and
obtain about half a gallon of tarry residuum of
about the consistency of tar or roof paint; no value
as a lubricant, and would simply clog up the engines.
For your information, we are sending you
under seperate cover, a small sample of the oil from
the system.
The Skinner has our hearty indorsement,
and we will be glad to confirm this to any one inter-
ested, either at our plant or by letter.
Very sincerely yours,
Julian & Kokenge Co
Chief Engineer
. . . A Footsaver Agency is a Sign of Progress . . .
SHORTBACK LASTS . . exclusive with J&K

SKINNER
SUPER FILTER

THE SKINNER SUPER FILTER is a simple, compact unit which assures positive control of the lubricating conditions in a Diesel engine by constantly removing all the injurious impurities from the lubricating oil. This mechanical filter floats on the line efficiently and automatically maintaining the lubricating oil in excellent condition.

These Super Filter units are made up of many hundreds of very thin flexible discs, pressed closely together without spacers, which remove from the oil passing between these discs all the injurious impurities, including all solid matter and both free and entrained moisture.

The filtering operation is fully automatic and extremely simple. The impurities are stopped at the edge of the filter packs and they are cleaned by merely blowing or reversing flow through the filter packs with compressed air. Units of proper size are available to take care of any size or type of Diesel installation. The outstanding service rendered by the Skinner Super Filter in the plant of the Julian & Kokenge installation is but typical of what you can expect in your own plant.



Notice SKINNER SUPER FILTER against the wall in this Julian & Kokenge installation of three 225 hp. Buckeye Diesels. See full details in article on pages 28 and 29 of this issue.

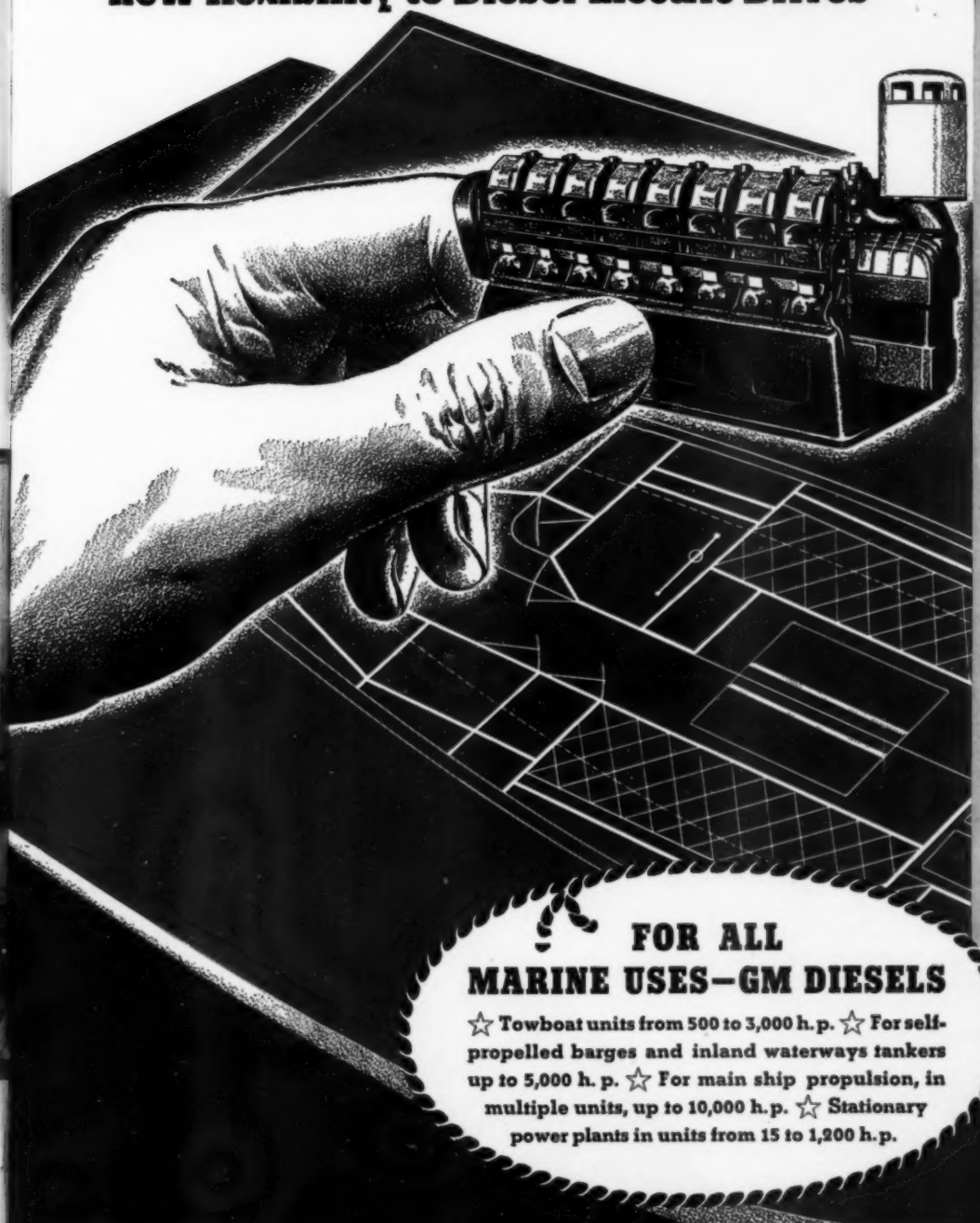
Use Quickmail Coupon No. 28

SKINNER PURIFIERS Inc.

2231 DALZELLE STREET • DETROIT, MICHIGAN

NOW, PUT IT *ANYWHERE!*

GM Diesel Power installations bring new flexibility to Diesel-Electric Drives



IT'S no longer necessary to design a ship around its power plant, to concentrate all machinery in one big engine room that takes up space you might otherwise use more profitably.

That's one of the great advantages of Diesel-Electric Drive—an advantage that GM Diesel Power units now make even more desirable than ever!

For, thanks to the development of the GM 2-cycle principle, the GM Diesel is lighter, more compact—fits in places forward, aft, or amidships that could not accommodate other units of comparable power.

Yes, you save in lots of new ways with this new kind of Diesel. You save space as well as fuel. You save time and trouble in maneuvering, with all your controls in the pilot house or on the bridge. You save the cost of standby losses in port.

And under the General Motors all-inclusive policy of manufacture, installation and service, you are assured of a minimum of "time out" for servicing and repairs.

If you want more power, in less space, at a lower operating cost—learn what GM Diesel Power, successor to the Winton Diesel, can do for you. Note the complete range of sizes and applications in the panel at the left.

FOR ALL MARINE USES—GM DIESELS

☆ Towboat units from 500 to 3,000 h.p. ☆ For self-propelled barges and inland waterways tankers up to 5,000 h. p. ☆ For main ship propulsion, in multiple units, up to 10,000 h.p. ☆ Stationary power plants in units from 15 to 1,200 h.p.

W — FORMERLY WINTON

GM DIESEL POWER

GENERAL MOTORS

SALES CORPORATION

DIESEL ENGINE DIVISION · Cleveland, Ohio

USED OIL BEFORE AND AFTER PASSING THRU A Y-M OIL PURIFIER
The body of the oil has been restored through removal of fuel dilution, acids removed and even new oil appearance imparted by elimination of tarry material.

THE FACTS

ARE YOURS . .

FOR THE ASKING .

If you are interested in controlling fuel dilution of the lubricating oil, removing acids, abrasives, water, gums and tarry material, the YOUNGSTOWN MILLER PURIFIER offers a simple, proven and inexpensive method.

These machines are built in many sizes for very small to very large plants. All handle gas and gasoline engine, transformer, ice machine and turbine, as well as Diesel oils.

With this equipment, used oil previously drained for discard can be salvaged for reuse as new oil. Many still doubt that used oil can be restored and thereafter maintained in such clean condition as is possible with every size of Y-M unit. There is ample proof of their effectiveness both on land and aboard ships in the service of such users as Denton, Tex.; Illinois Central Ry.; Parke, Davis & Co.; Inland Steel Company; Higginsville, Missouri; Erie Ry.; B & O Ry.; Cherokee, Okla.; American Pipe Line Company; Kilgore, Tex.; Dow Chemical Company; Ira S. Bushey and Sons, Inc.; Moran Towing and Trans. Company; Delaware-New Jersey Ferry Company; M. H. Renken Dairy Company; Lowell, Mich.; Lake Geneva, Wis.; Bloomington, Ill.; Medusa Portland Cement Company; and others whose names are available. . . . And you can see one operate in your own plant — before one dollar is invested.

THE YOUNGSTOWN MILLER CO.,
SANDUSKY, OHIO

5

Electric current available . . . . . Volts A.C. or D.C.
Main Engines

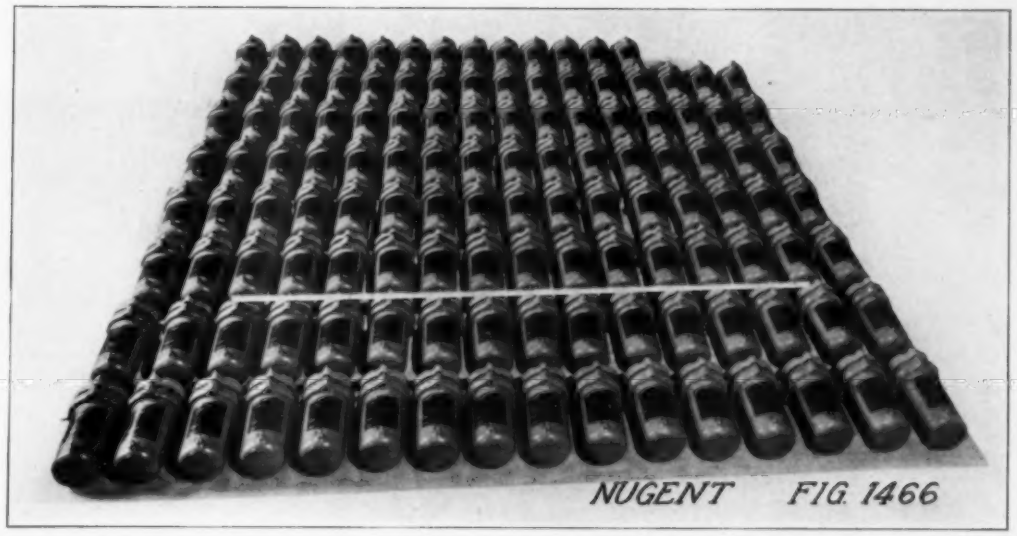
H.P.	MAKE	TYPE	LUBE OIL CAPACITY

Gals. drained—trucks and cars.....per mo.
Gals. other oils to be reclaimed.....per yr.

Name.....
Address.....
.....

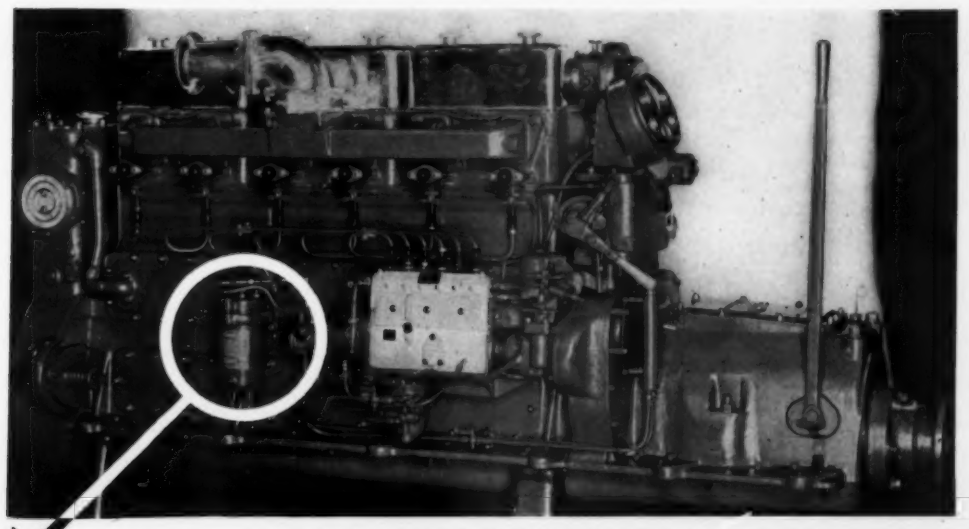
Use Quickmail Coupon No. 15 on your envelope

Photograph of just one shipment of Nugent Filters for the U.S. Navy.

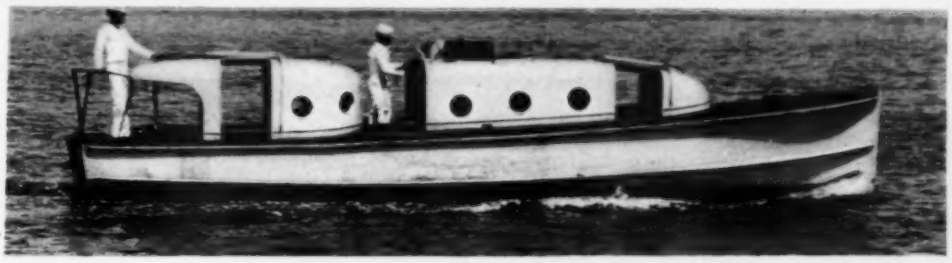


NUGENT FUEL OIL Filters

USED BY U.S. NAVY



The Nugent Large Area (Patented) Fuel Oil Filter has 300 sq. inches of filtering surface, consisting of very closely woven, lintless, acid resisting fabric which removes particles as small as .0004".

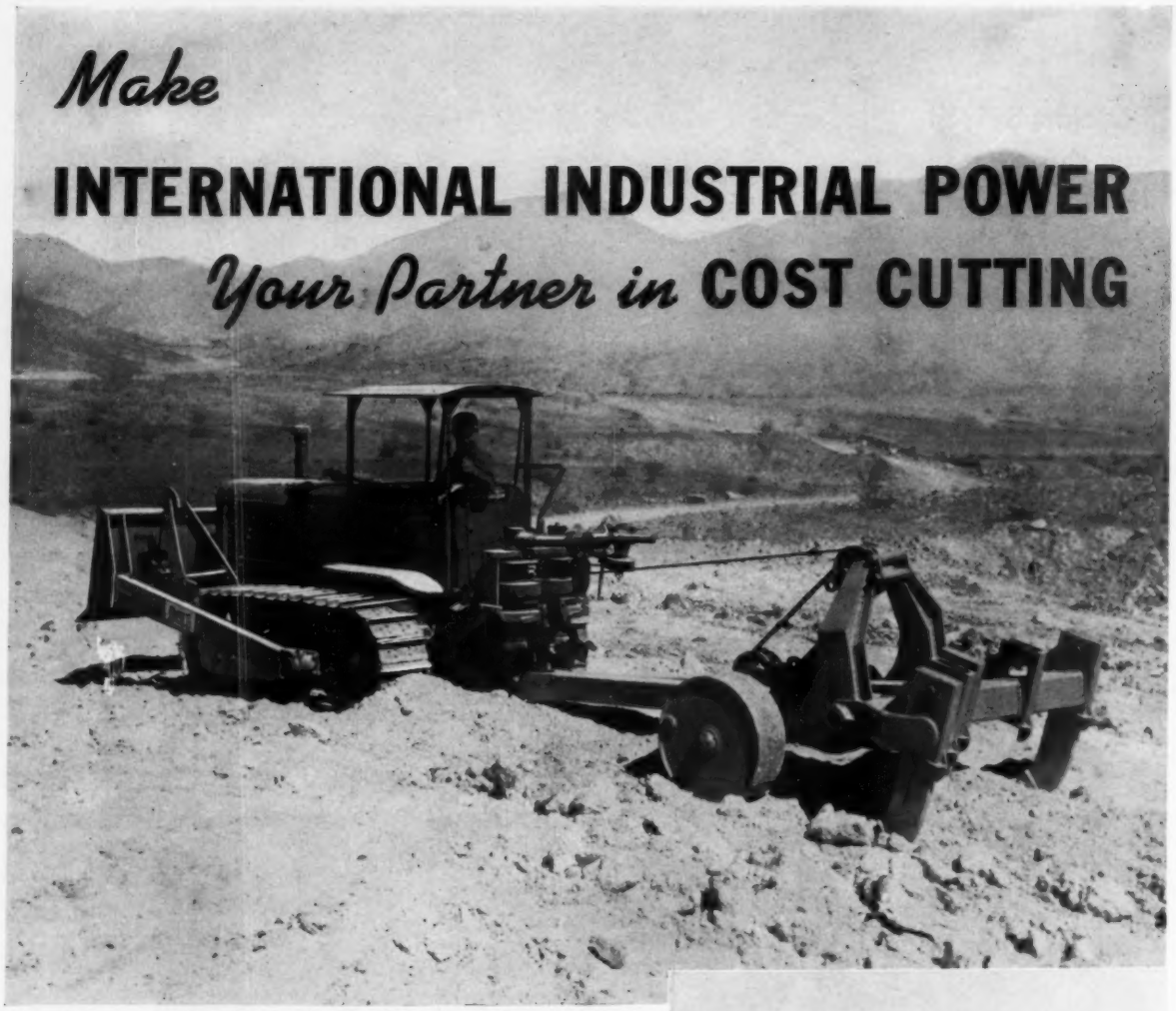


Photograph of a Diesel Powered Navy Power Boat

SPECIFY NUGENT FUEL AND LUBRICATING OIL FILTERS FOR YOUR DIESEL ENGINES

SEND FOR BULLETIN 7A • USE QUICKMAIL COUPON No. 26

Wm. W. Nugent & Co., Inc. Mfrs.
Oil Filters, Oiling and Filtering Systems, Telescopic Oilers, Oiling Devices,
Sight Feed Valves, Flow Indicators, Compression Union Fittings, Oil Pumps, Etc.
415 N. Hermitage Ave. Established 1897 Chicago, U. S. A.



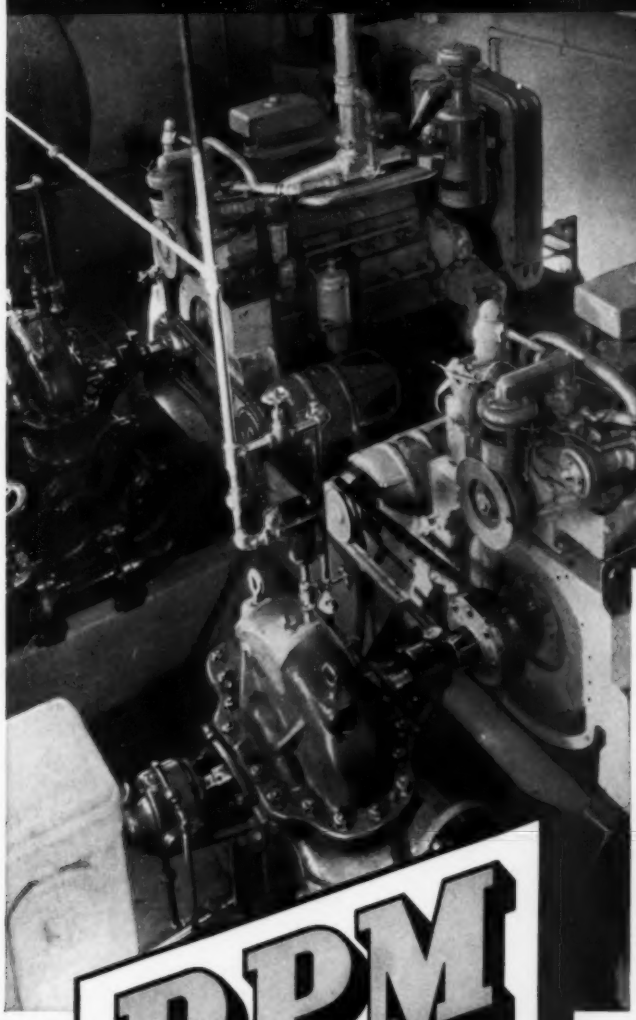
Above: An International TD-40 Diesel TracTracTor ripping the surface to get at the deposit of gypsum in the mines of the United States Gypsum Co. at Midland, Calif. *Right, below:* The TracTracTor building a mountain road near the gypsum mines.

INTERNATIONAL HARVESTER builds a complete range of power and transportation equipment. *Crawler tractors, wheel tractors, power units, and motor trucks* . . . all are available under the International banner, and all have the same *International Harvester quality* built into them from end to end. Pick your equipment from this one broad line and make sure of outstanding performance. And there is *service,* too, to think about. International dealers and Company-owned branches know all about the service needs of heavy-duty equipment, and maintain service departments and parts stocks that meet every requirement. The nearby International dealer or branch will give you complete information.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

More "RPM" Diesel Engine Lubricating Oil is being sold and used in "Caterpillar" Diesel Engines than all other Diesel Oils combined



RPM
TRADE MARK REGISTERED
DIESEL ENGINE LUBRICATING OIL

Approved by
CATERPILLAR TRACTOR CO.

"RPM" Diesel Engine Lubricating Oil is distributed by the following companies under the brand names indicated:

IN THE UNITED STATES

"RPM" Diesel Engine Lubricating Oil:
THE CALIFORNIA COMPANY (Montana only)
THE CARTER OIL COMPANY, Tulsa, Oklahoma
HUMBLE OIL & REFINING COMPANY
STANDARD OIL COMPANY (Indiana)
STANDARD OIL COMPANY (Inc. in Kentucky)
STANDARD OIL COMPANY (Nebraska)
STANDARD OIL COMPANY OF CALIFORNIA
STANDARD OIL COMPANY OF TEXAS
UTAH OIL REFINING COMPANY

Diol "RPM" Diesel Engine Lubricating Oil:
COLONIAL BEACON OIL COMPANY, INC.
STANDARD OIL COMPANY OF LOUISIANA
STANDARD OIL COMPANY OF NEW JERSEY
STANDARD OIL COMPANY OF PENNSYLVANIA

Signal "RPM" Diesel Engine Lubricating Oil:
SIGNAL OIL COMPANY

Sohio "RPM" Diesel Engine Lubricating Oil:
THE STANDARD OIL COMPANY (Ohio)

IN CANADA

"RPM" Diesel Engine Lubricating Oil:
IMPERIAL OIL LIMITED
STANDARD OIL COMPANY OF BRITISH COLUMBIA LIMITED

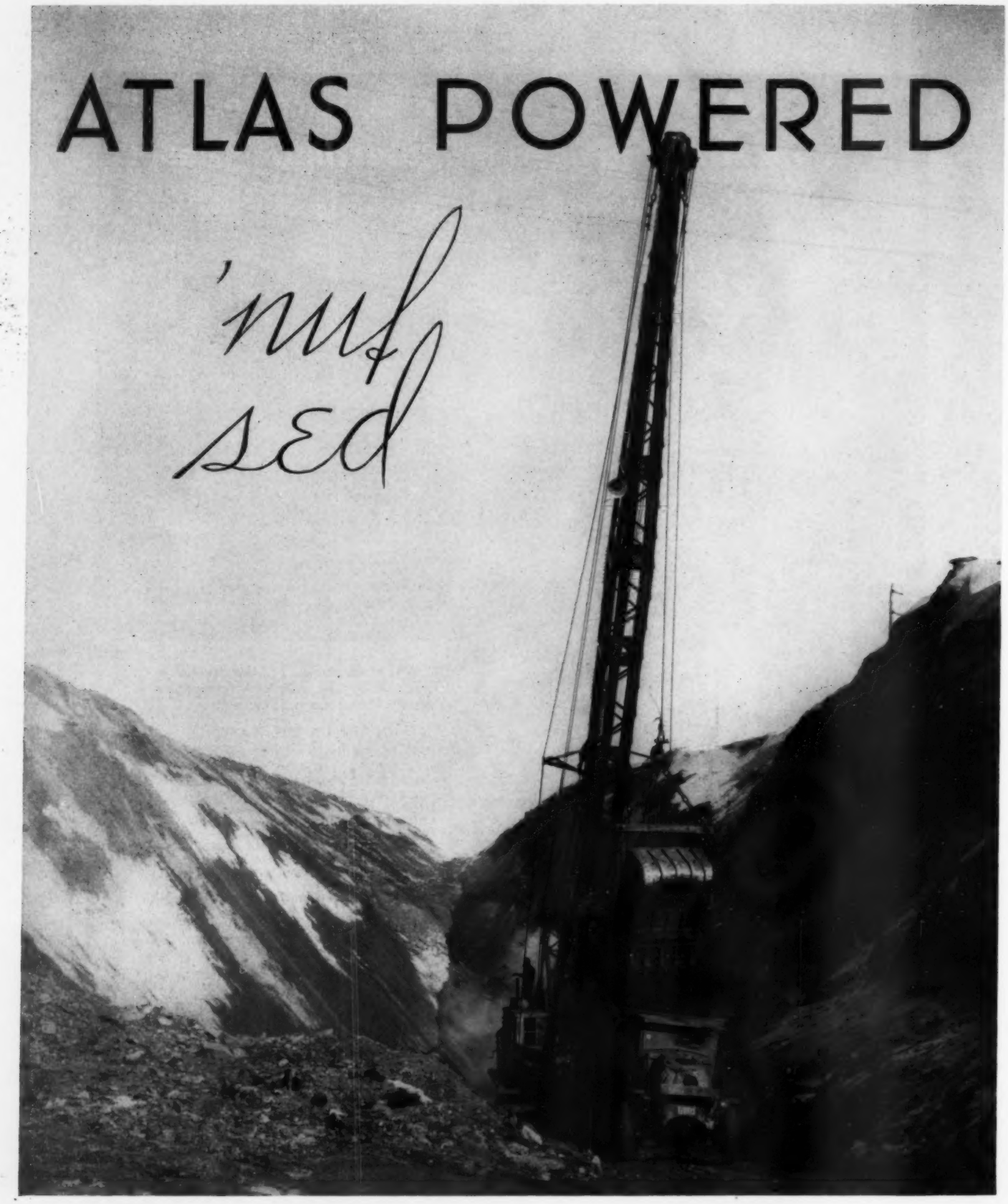
THROUGHOUT THE WORLD

"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries.

STANDARD OIL COMPANY OF CALIFORNIA

ATLAS POWERED

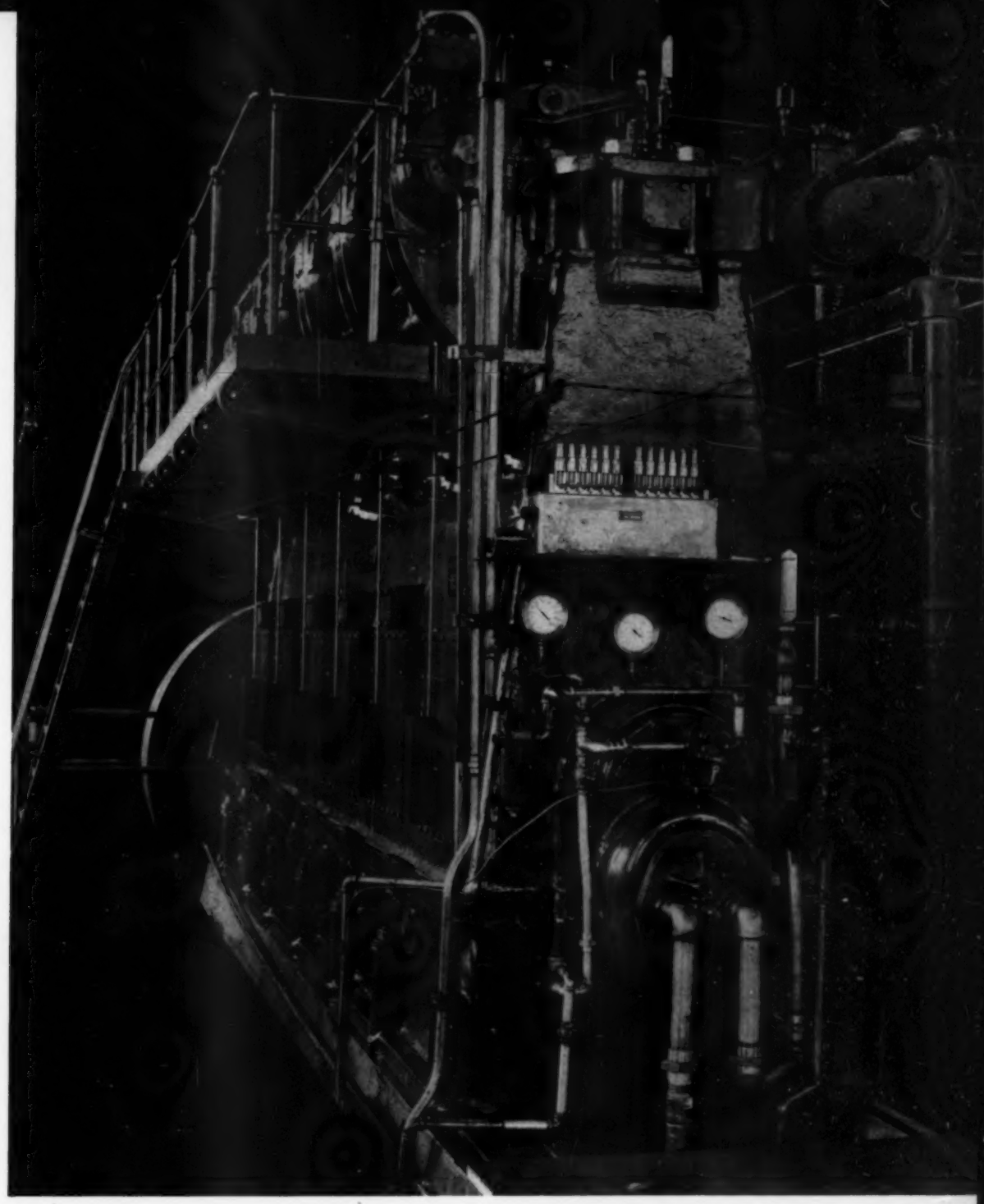
'nuf sed



ATLAS IMPERIAL DIESEL ENGINE COMPANY

OAKLAND, CALIFORNIA **MATTOON, ILLINOIS**

ATLAS IMPERIAL



Fulton Diesel engine, six-cylinder, 750 hp., one of three units for the R.E.A. power plant at Pocahontas, Iowa. The other two engines are eight cylinder, 1000 hp. Fulton Diesels. All are equipped with Satco bearings.

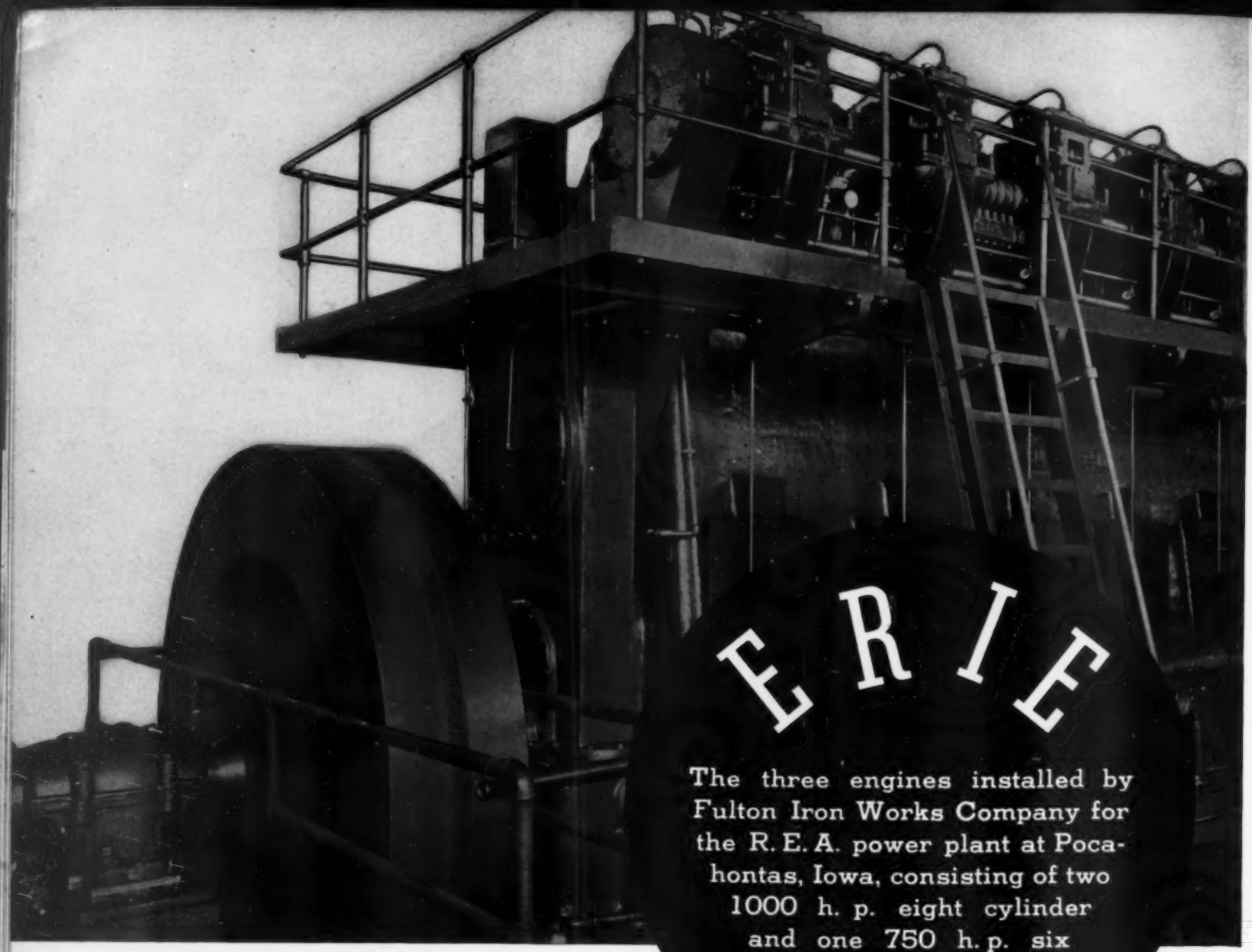
THE highly trained metallurgist, with a degree-studded academic background, can explain why a certain alloy ought to make a good bearing metal. And the laboratory and shop technician can devise a variety of tests to demonstrate a certain alloy's fitness as a bearing material. BUT the only sure way to find out whether this alloy or that alloy will do a real bearing job is to put it to work in an engine. Satco* metal checks with the metallist's reasoning, it passes the laboratory and shop tests and, most important, it does stand up in service. Diesel operators everywhere will testify to this fact . . . they have obtained first-hand proof of Satco's fitness and dependability. We invite inquiries from Diesel builders and owners who are looking for a way out of their bearing difficulties.

**A patented alloy manufactured by National Lead Company. Trade-mark registered.*

AMERICAN BEARING CORPORATION

AFFILIATED WITH NATIONAL LEAD COMPANY

INDIANAPOLIS — CENTRIFUGAL — American Bearings — FORCE — INDIANA



The three engines installed by Fulton Iron Works Company for the R. E. A. power plant at Pocahontas, Iowa, consisting of two 1000 h. p. eight cylinder and one 750 h. p. six cylinder, are equipped with Erie crankshafts.

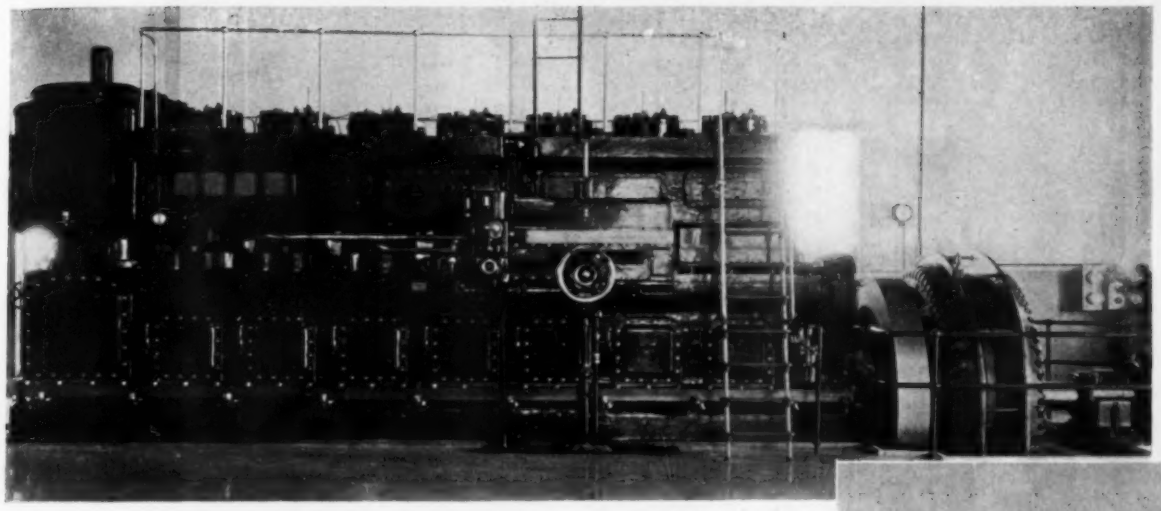
The repeated use of Erie crankshafts by all leading Diesel engine builders over the many years of Diesel engine use in this country is proof of their high quality and accurate finish.

Leading Diesel engine builders rely upon our experience and complete facilities for the manufacture of crankshafts and other forged parts, finished to the most exacting tolerances.

ERIE FORGE COMPANY

ERIE, PENNSYLVANIA

· DIESEL FILTERS ·



7 cylinder, 1400 hp. Fairbanks, Morse Diesel engine installed in the Scott City, Kansas, plant of the Inland Utilities Company. Right: Exterior of the Scott City, Kansas, Diesel plant.

SENTINEL FILTERS HAVE BEEN INSTALLED IN THE FOLLOWING INLAND UTILITY COMPANY'S PLANTS:

Scott City, Kansas — 1 Model 400, Size #40
1 Model 400, Size #60
Stratton, Colorado — 1 Model 400, Size #10
Espanola, N. Mex. — 1 Model 400, Size #10
Lovington, N. Mex. — 1 Model 400, Size #10
Ft. Sumner, N. Mex.—1 Model 400, Size #10
Cheyenne Wells, Col.—1 Model 400, Size #10
Grants, New Mexico —1 Model 400, Size #10
Syracuse, Kansas — 1 Model 400, Size #10

DEALERS

O. Smith Johannsen
50 Church Street
New York, N. Y.

Diesel Plant Specialties Co.
510 North Dearborn Street
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Western Sales Co.
200 Davis Street
San Francisco, Calif.

Burrard Iron Works Ltd.
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Vancouver, B. C.

L. C. Badouin
La Paz, Baja Calif.,
Mexico

Seaside Supply Stores
638 South Seaside Ave.
Terminal Island, California

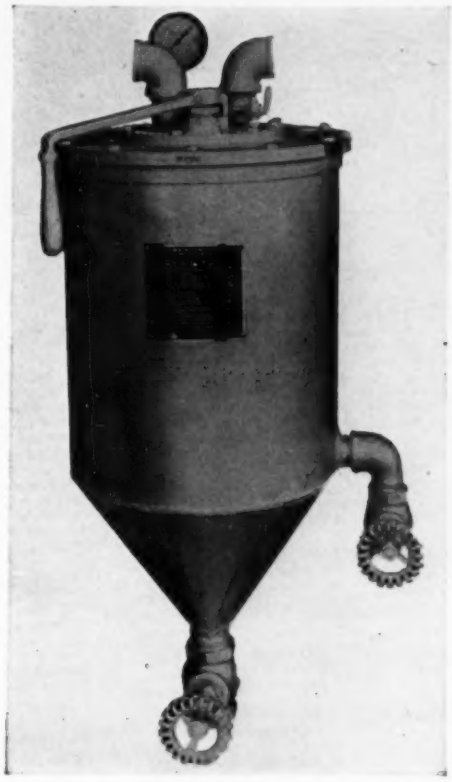
Hathaway Machinery Co.
New Bedford, Mass.

Calmes Engineering Co.
215 Carondelet Bldg.
New Orleans, La.

Intermountain Diesel Sales Corp.
65 West 4th, South,
Salt Lake City, Utah

William A. Furtwangler
4 Broad St.
Charleston, S. C.

Captain W. J. Moloney
404 Colman Bldg.
Seattle, Wn.



Model 400

The Inland Utilities Company, Kansas City, Mo., are successfully using Sentinel filters in eight of their Diesel plants as itemized above. A Sentinel filter was first installed in one of these plants. The results were so extremely successful that the seven additional plants were similarly equipped.

"Sentinel" Oil Filters eliminate 100% of all water and solids to 1/10,000 of an inch and have a high efficiency to 1/50,000 of an inch. They are therefore more than just oil strainers, they act as a real filter.

When you want the best in oil filters, you will install a "Sentinel." Why not write today to your nearest representative of "Sentinel" Oil Filters. They will be glad to furnish you with information on filters for your engine.

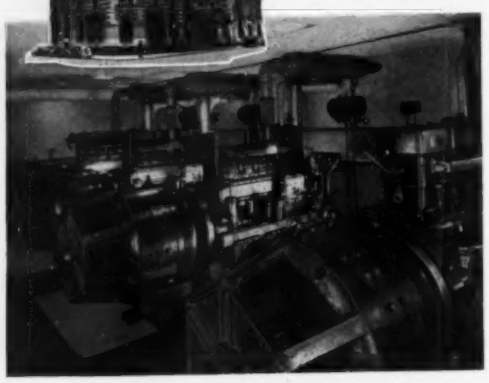
DIESEL FILTER CO.
(INCORPORATED)
MANUFACTURERS
SENTINEL
OIL FILTERS
ASTORIA, OREGON

Use Quickmail Coupon No. 18

NEW YORK DIESEL ENGINEER REPORTS ON

MACMILLAN RING-FREE MOTOR OIL

A typical installation at the Hotel Seville



You, too, will find that RING-FREE will reduce your costs of operation and maintenance in gasoline, diesel or natural gas motors . . . in automotive equipment, tractors, boats or stationary installations.

MEMO To Macmillan Petroleum Corporation [address the office nearest you]

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624 So. Michigan Avenue, Chicago ☐
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Please have the Macmillan Man call on our

Mr. _____

Firm _____

Address _____

AUTOMATIC DIESEL ELECTRIC, INC.
THE STRONG SYSTEM
37 WEST 43rd ST., NEW YORK

March 17, 1938.

Macmillan Petroleum Corporation,
50 West 50th Street,
New York, N. Y.

Gentlemen:

You will be interested to learn the details of our experience with Macmillan RING-FREE Motor Oil. As you know, we construct and operate single and multiple unit electric generating plants which supply electric power to office buildings, hotels, apartments, hospitals, etc. We have a variety of diesel engines in our plants, most of which are Buda or National Superior diesel engines. We have sixteen such installations in operation in New York City. In all cases where we install units it is our policy to retain responsibility on an operation contract.

Our main problem is one of keeping these engines in efficient 24 hour-a-day operation. Such constant running creates lubrication problems not experienced where engines are frequently stopped and allowed to cool. The slightest sign of blow-by and loss of compression means the engine must be overhauled.

Before selecting RING-FREE, we ran exhaustive tests of the leading motor oils. The results of the tests and of recent operations in all units have shown conclusively that RING-FREE reduces our costs of operation, primarily because it reduces carbon troubles.

Our records show your oil at least equals any other oil in any quality you care to name and is, as far as we know, the only satisfactory oil that removes carbon.

You will be glad to know that we plan to expand our business to a nation-wide operation.

Very truly yours,

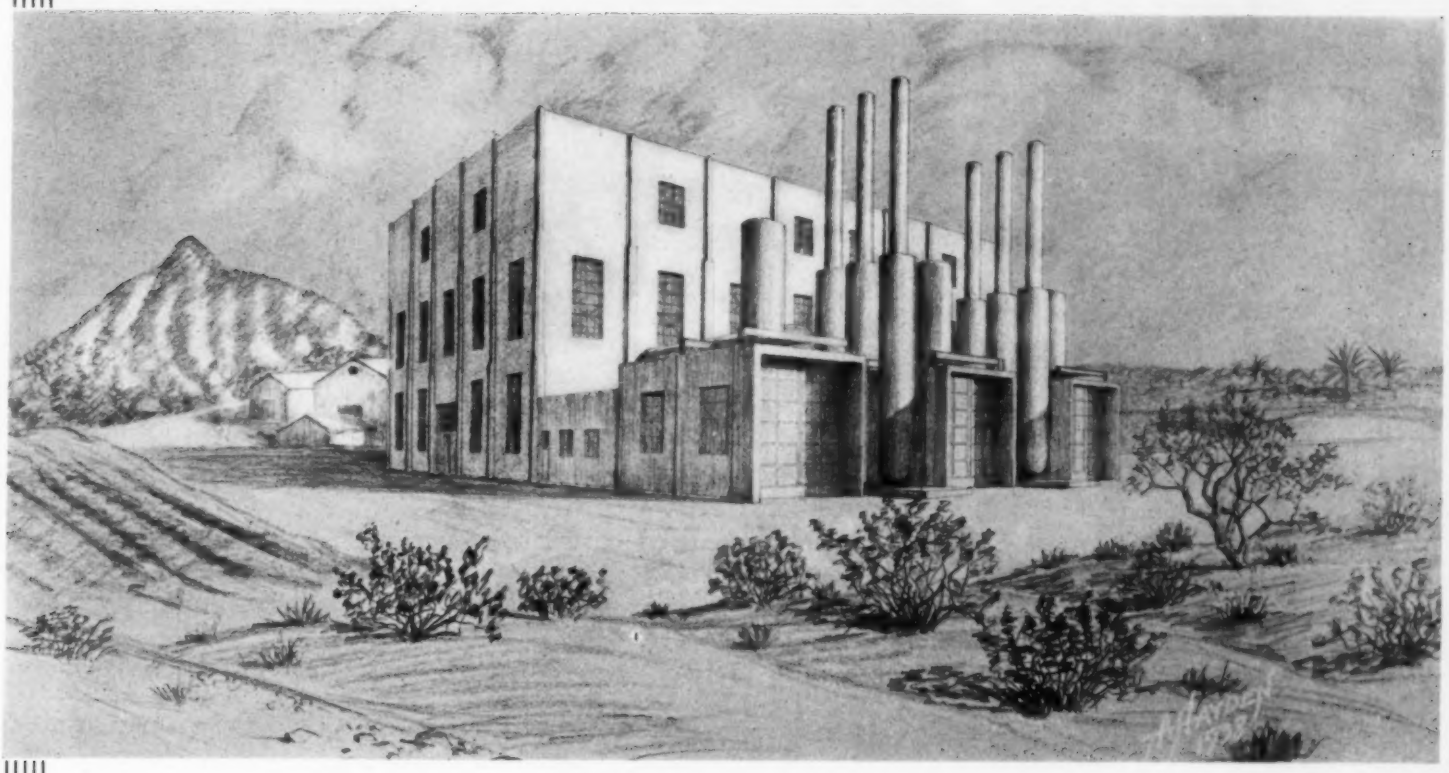
AUTOMATIC DIESEL ELECTRIC, INC.,

By C. F. Strong
President.

C.F.Strong/JL

MACMILLAN PETROLEUM CORPORATION

at Tempe, Arizona



At Tempe, Arizona, one of the most interesting and modern Diesel engine plants is now under construction. This installation will consist of two 7000 hp. Hamilton-M.A.N. Two Cycle, Double Acting, Eight Cylinder, 24″ x 36″ Diesel Engines. In effect, these two engines are duplicates of the five 7000 hp. Hamilton-M.A.N. engines installed at Vernon, Calif. This outstanding new plant at Tempe will be used for standby and peak load service for the Salt River Valley Water Users' Association of Phoenix, Arizona.

HAMILTON - M. A. N.

GENERAL MACHINERY CORPORATION

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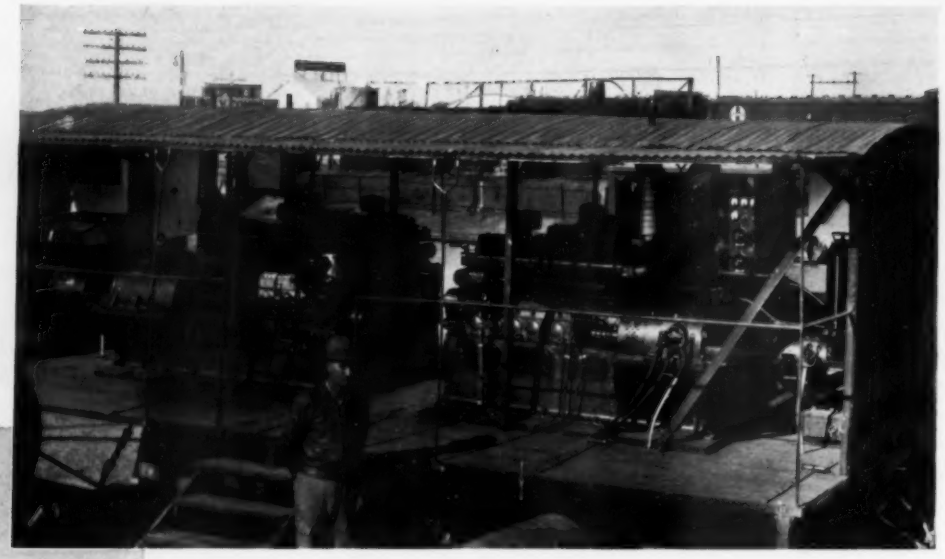
"Juice" for A TOUGH JOB



A portable, multiple-unit—240 K. W., D. C. Diesel Electric Power Plant for operating a special electric drilling rig in the West Texas oil fields.

The compact, light weight yet sturdy construction of the Superior high speed Diesel engine made possible the development of this highly successful and unique portable power house.

Using four Superior 60 K. W. variable speed, constant voltage, D. C. generator sets, a total capacity of 240 K. W. is available for peak loads while drilling at maximum depths.

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Superior Diesels have won the confidence and approval of oil men the country over through proven high standard performance.

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H.P., 250 to 720 R.P.M.

HIGH SPEED MODELS: 15 to 150 H.P., 900 to 1800 R.P.M.

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A NEW GOULDS EXHAUST GAS HEATER FOR HYDROILS

GOULDS Hydroil Centrifugal Oil Purifiers have amply proved that they DO decrease diesel operating and maintenance costs. Now Goulds brings to diesel operators another big advantage—the Goulds Exhaust Gas Heater that, without any operating cost, pre-heats oil for centrifuging.

Cold oils and oils of high viscosity are quickly and economically heated for efficient centrifuging, by utilizing B.T.U.'s otherwise wasted.

It does away with the need for current-consuming electric heaters, requires little attention, controls the temperature automatically or manually.

Every diesel operator will appreciate the value of this Goulds engineered, money saving, heater. Let us send you Bulletin No. 510 on the Goulds Exhaust Gas Heater or have our engineers analyze your requirements.

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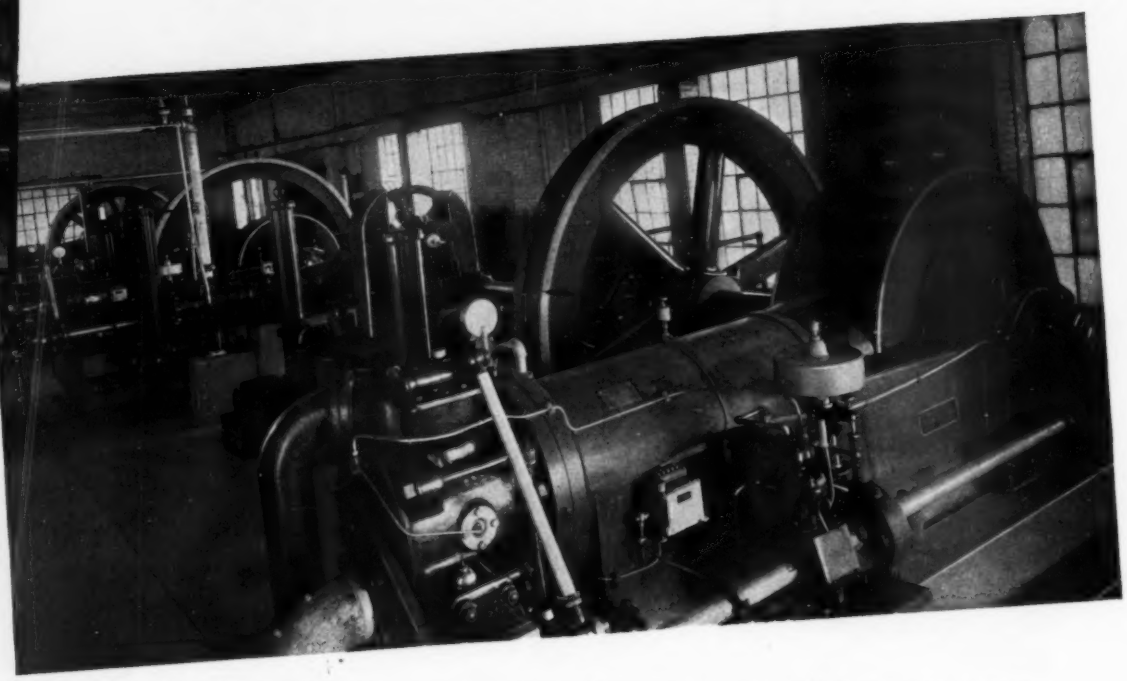
A life of from 17 to 21 years for cylinder liners is an outstanding example of effective lubrication as a contributing factor in Diesel and other oil engine economy.



Two De La Vergne 125 h.p., 156 r.p.m. solid injection oil engines and one 140 h.p., 164 r.p.m. engine, direct-connected to triplex pumps.

THIS is the record of these three De La Vergne Oil Engines in Douglas, Arizona, pumping station. On one of these engines, 21 years' service was recorded for a single liner. On another, 19 years without change. On the third, 17 years. All have used Texaco exclusively since they were installed.

The performance of Texaco Lubricants is given a large measure of credit for the surprising freedom from wear and long continuous trouble-free service.

Records like this show why more and more Diesel operators each year are turning to Algol or Ursa Oils . . . why *more stationary Diesel h.p. in the U. S. is lubricated with Texaco than with any other brand.*

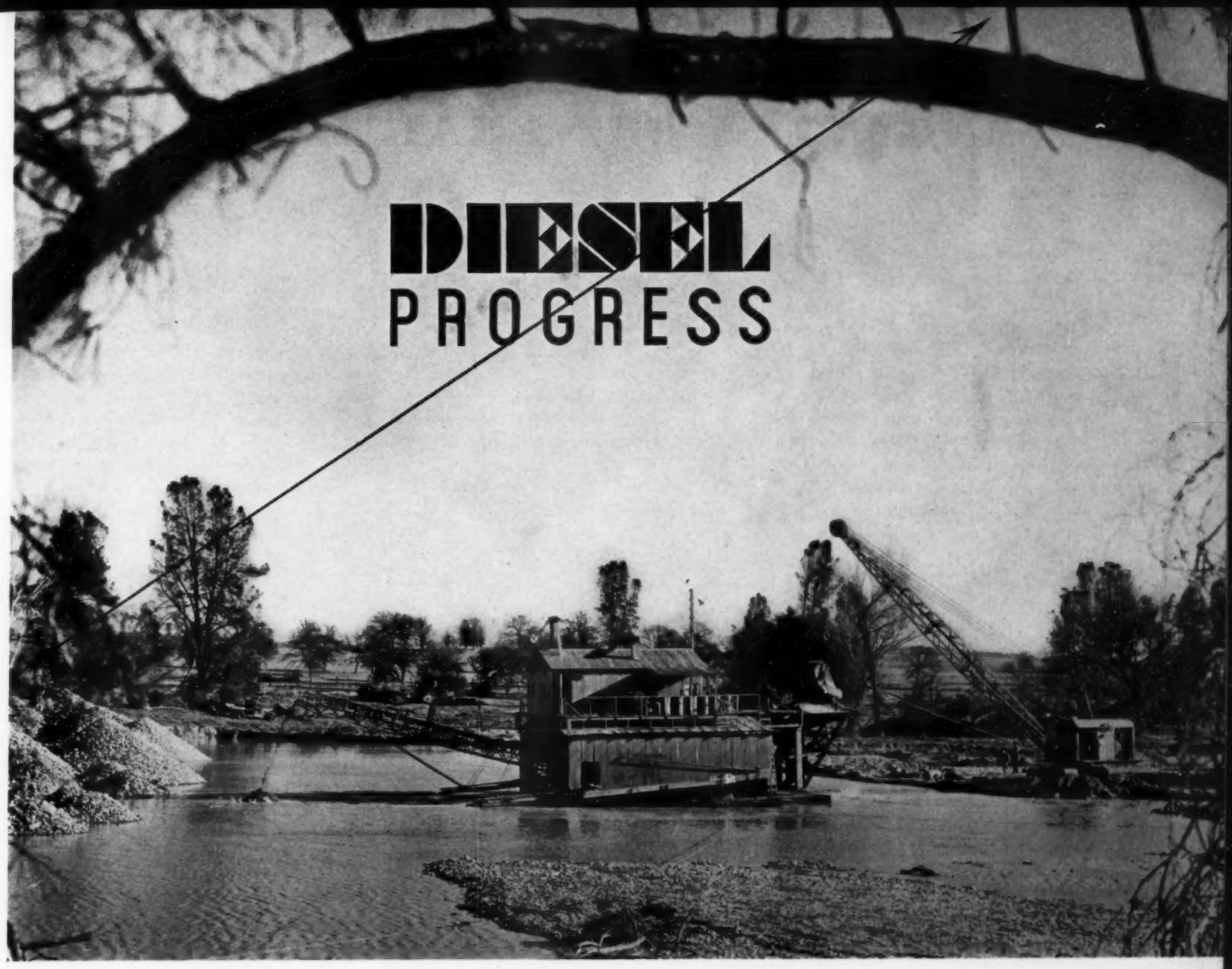
Trained lubrication engineers are available for consultation on the selection and application of Texaco Diesel Lubricants. Prompt deliveries assured through 2108 warehouse plants located throughout the United States.

The Texas Company, 135 East 42nd Street, New York City.

TEXACO

TEXACO

Algol and Ursa Oils for DIESELS



REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: Caterpillar Diesel Tractor and LeTourneau Carryall Scraper building the ramps for the Fair from the San Francisco Bay Bridge around the south side of Yerba Buena Island. Owned by Parish Bros.

TABLE OF CONTENTS ILLUSTRATION: Two Caterpillar Diesels, one in Bodinson Dredge, the other in Lima Dragline, working in Honcut Creek, near Palermo, Calif. Owned by Cinco-Mineros Dredge Company.

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MAY CONTENTS

	PAGE
MANHATTAN GENERAL HOSPITAL	20
FORTIETH ANNIVERSARY FIRST AMERICAN DIESEL ENGINE	22
WATERVILLE MANUFACTURING CO.	22
PARATEX	23
JULIAN & KOKENGE SHOE COMPANY	28
DIESEL ENGINES FOR COTTON GINS	30
DIESEL BREAKS WORLD'S FLIGHT RECORD	32
BORDEN COMPANY'S DIESEL ELECTRIC PLANT	34
FLOOD RESTORATION WITH DIESELS	36
GEARED ELECTRIC DRIVE	38
YACHT *BETTINA*	40
FOR NAVAL ARCHITECTS ONLY	42
S.A.E. NEWS	44

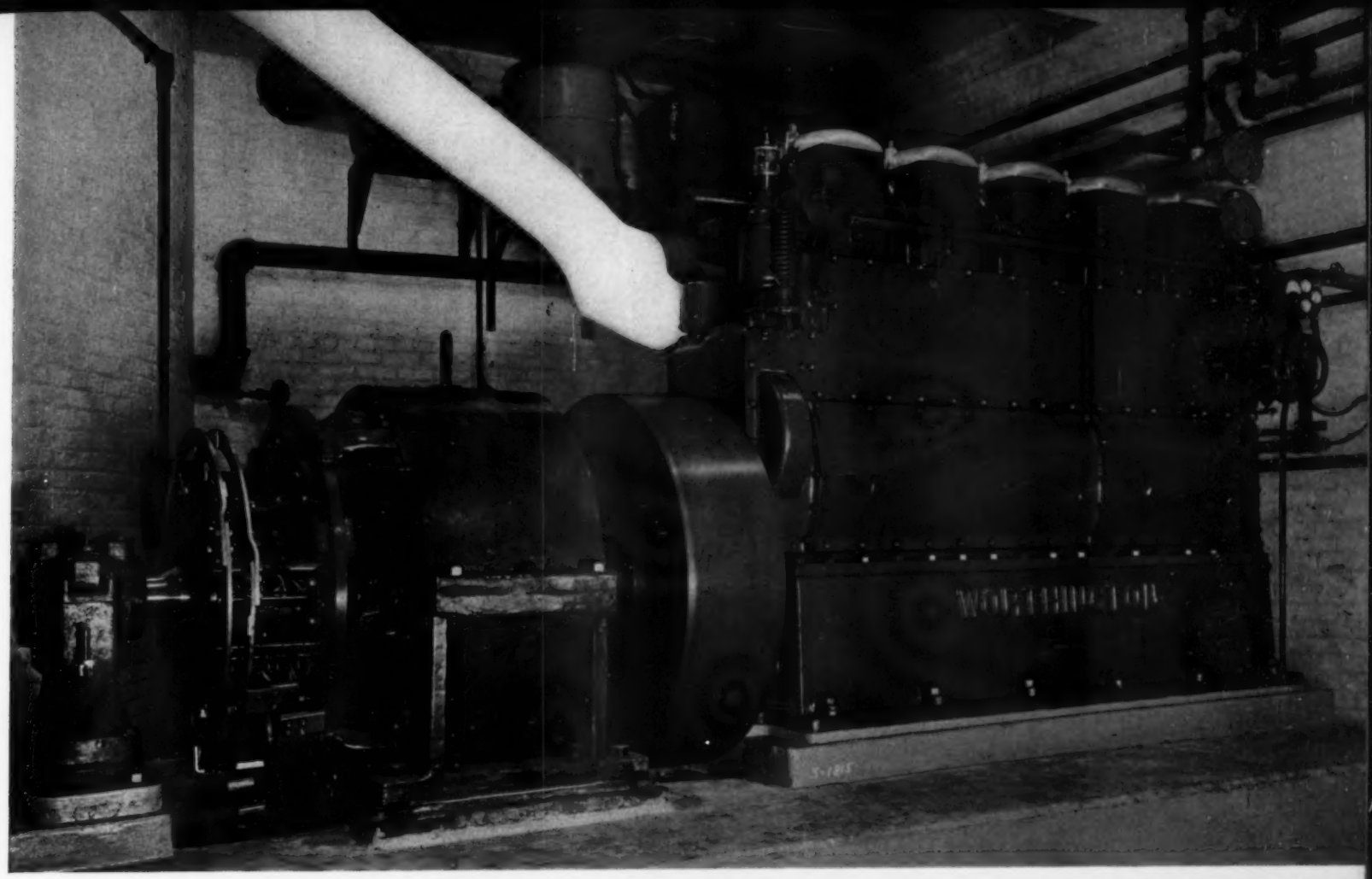
MANHATTAN GENERAL HOSPITAL

ONE of the most important considerations in connection with modern hospital management is a thoroughly dependable source of electric light and power. While there have been numerous heroic incidents when surgeons have successfully completed intricate and vital operations by flashlight or candle light, due to interruption of public utility power by storms or floods, the public is entitled to maximum protection from this type of risk. The Manhattan General Hospital in the city of New York completely eliminates such a possibility by operating an independent power plant composed of both steam and Diesel generating units. Light must and will not fail!

This imposing building was first opened about forty years ago as the Lying-In-Hospital and was acknowledged to be the finest in the city. After merging with the New York Hospital it was necessary to expand to larger quarters and the property was vacant for several years. Upon being completely remodeled and equipped, the building was again opened by Dr. Richman under the now familiar name of Manhattan General Hospital. Its present success and reputation bear eloquent testimony to Dr. Richman's foresight and untiring efforts.

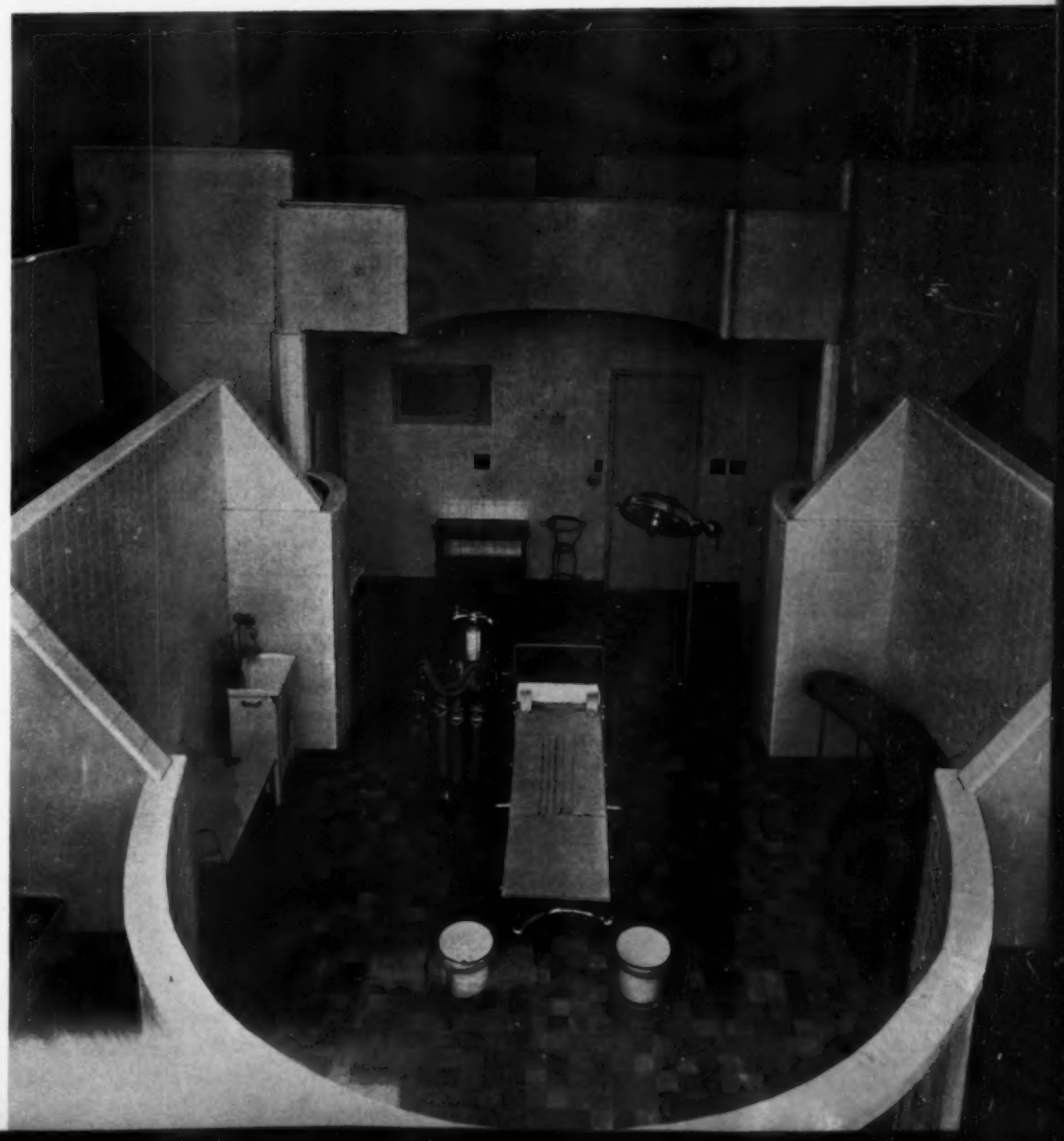
The original power plant consisted of three Pheonix steam engines which drove electric generators rated at 100, 150 and 250 kilowatts respectively. The largest unit was installed to supply power for an elaborate heating, ventilating and cooling system which was discovered to be unnecessary for comfortable occupancy of the building. As a result, this unit was never operated and the load, which has an average peak of 100 kw. was carried by one or the other of the smaller engines.

Last year Dr. Richman decided to increase the dependability of his stand-by power service and at the same time reduce materially the annual power cost. Accordingly, he retained the Diesel Electric Company of New York to make recommendations and supervise necessary changes. It was ultimately decided to eliminate the public utility service entirely and to install a Diesel engine in addition to the two steam generating units. (The largest steam engine was removed during the remodeling operations.) A 5-cylinder Worthington Diesel was selected, which develops 150 hp. at 600 rpm. and drives a specially built Elliott generator. Upon the advice of W. R. Billard, Chief Engineer, that a vibration problem existed due to the presence of "rim rock" which came to the surface again several blocks away, both Diesel and generator were mounted on a concrete block which, in turn, was supported by eight Korfund steel spring Vibro-Dampers. Without this precaution vibration would have been transmitted throughout the hospital and also to a dwelling further down the street due to the peculiar geological formation of the foundation. Auxiliary equipment for the new Diesel consists of Viking Safety Control, Alnor pyrometer, Vortex intake air filter and a Maxim exhaust muffler.

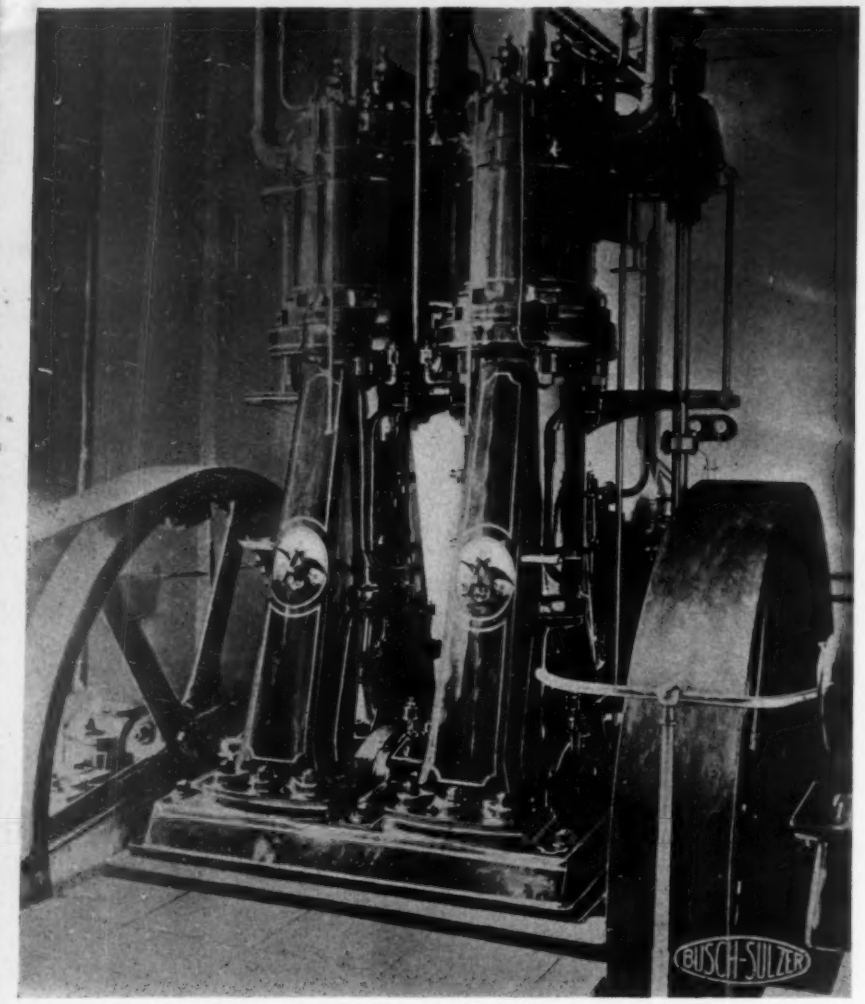


Above—150-hp. Worthington Diesel with specially designed Elliott generator, recently installed at the Manhattan General Hospital. Ventilating equipment furnished by B. F. Sturtevant Company.

Right—The modern operating room where continuous light, so essential to intricate and vital operations, is assured by reason of the Hospital's independent power plant.



From the standpoint of economy and dependability this is now an ideal power plant and is representative of what can be done to improve many similar situations. During the winter electricity is steam generated to accommodate the heating load from the exhaust. Conversely, during the summer months, the Diesel is operated. Throughout the entire year and under the most severe load conditions possible there is a minimum stand-by capacity of 100 kw. which is equal to the average peak load. One of the many advantages of the Diesel engine—its ability to assume full load from an instantaneous cold start—is of major importance in this case for emergency duty. The conversion of this plant was financed by the Petroleum Heat & Power Company and it is estimated that it will pay for itself out of actual cash savings in less than five years. Meanwhile the hospital is assured of dependable power.



FORTIETH ANNIVERSARY FIRST AMERICAN DIESEL ENGINE

This 2-Cylinder 16 hp. Diesel Engine Was Built in St. Louis in 1898—Just Forty Years Ago.

JUST forty years ago in St. Louis, Missouri, the first commercial Diesel engine in the world was built and put into successful operation. Despite the fact that the Diesel engine was originally designed by Doctor Rudolf Diesel in Germany, the first commercial engine built to Doctor Diesel's designs was completed in this country by the late Adolphus Busch. It was started up in the summer of 1898 and after some preliminary testing was placed in the power plant of the Anheuser-Busch Brewing Association coupled to a DC lighting generator. This engine was used in regular operation for a long number of years and it was not until somewhere around 1922 that it was finally displaced by larger engines, having in effect served a useful life of some twenty-four years.

Whilst the Birth of the Diesel Engine in this country dates from 1898 it wasn't until 1915 that any volume of business was done in this country by manufacturers of Diesel engines. In that year the total production was approximately 75,000 hp. The growth of the industry was very slow for the next ten years because production had only reached approximately 275,000 hp. in 1924. The Diesel industry continued to expand from 1924 through to 1930 at a very satisfactory rate, reaching a total production in 1928 of some 450,000 hp. The depression began to hit this industry, as it did others, in 1929 and the production dropped from approximately 425,000 hp. in that year to a low of approximately 125,000 in 1932. In 1933 production doubled to approximately 250,000 hp. In 1934 it stepped up rapidly to approximately 750,000. Then in 1935 another big step-up to approximately 1,250,000 hp. Continuing this rapid increase in volume, in 1936 production was approximately 1,900,000 and then in 1937 an even bigger increase to a figure of approximately 2,850,000 hp.

In other words, as we look back over history the Diesel industry really started to hit its stride in 1934 and has been moving rapidly onward and upward ever since. It was one of the first of the heavy industries to come out of the late depression and it can be banked on as one of the first to come out of the current recession.

As we celebrate this Fortieth Anniversary of the first successful application of Doctor Diesel's ideas to a prime mover in this country, it is well also to remember that in 1937 one manufacturer of Diesel engines in this country built more Diesel engines than any other manufacturer in the world.

We have come far in forty years in taking Dr. Diesel's ideas and making practical, working engines out of them. We have reduced the weight per horsepower from 200 lbs. a few years ago to less than 20 lbs. per horsepower in the "packaged power" engine of today. We have reduced the price per horsepower in almost the same ratio, by means of mass production and American methods of design and construction.

But it is only just and fitting that we should, on this 40th anniversary of the first American Diesel, stop for a moment and pay tribute to Dr. Rudolf Diesel, the man who started such a small snowball arolling back there in the 1890's but who, unfortunatey, never lived to see that ball accumuate to the size it is today. Dr. Diesel suffered, as do most inventors, from lack of capital, from inability to "sell" his new ideas to industry. He died a tragic death, a disappointed, disillusioned man, but he left the world an idea of tremendous intrinsic worth. His brain and initiative contributed much to the advancement of science and industry, to the well being of his fellow man. So, may we all, in this Diesel Industry, take off our hats and bow our heads for a moment in memory of the Father of the Diesel – Dr. Rudolf Diesel.

Tanker "Paratex" in the Harbor of Beaumont.

"THE PARATEX" DIESEL-ENGINED TANKER

By B. J. VON BONGART

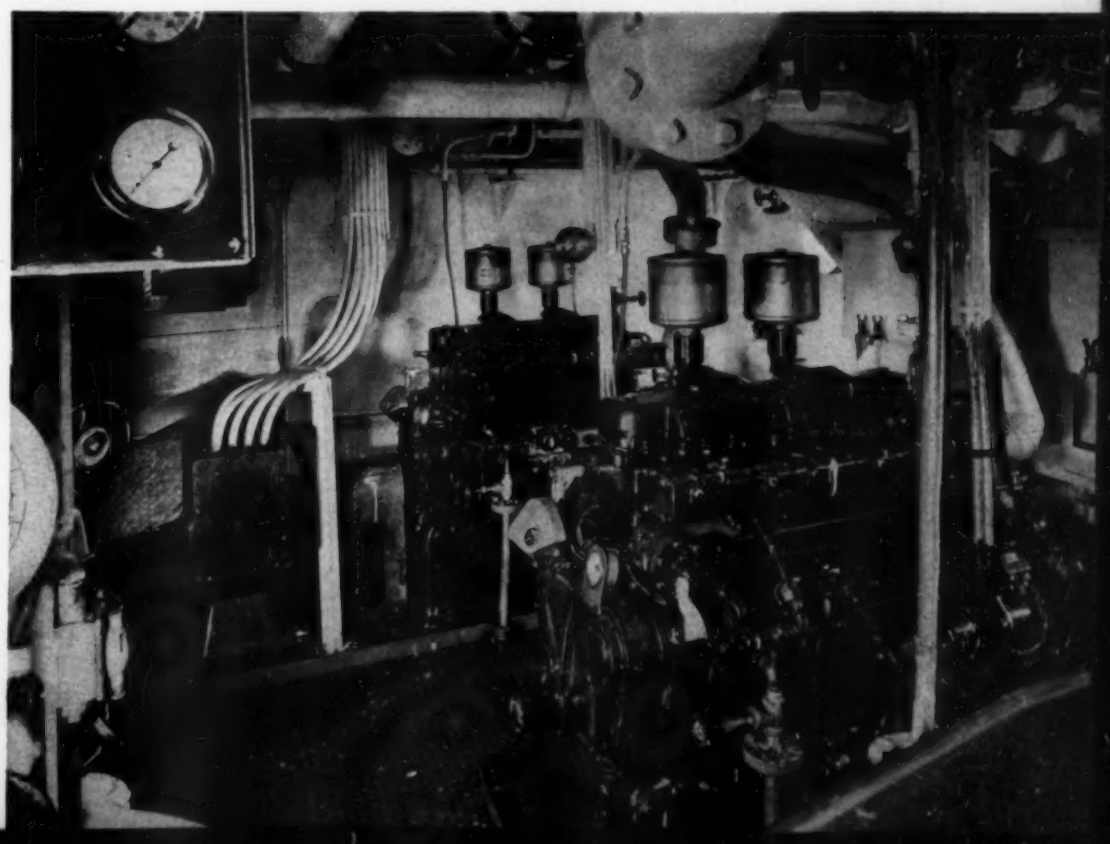
THE Gulf Oil Corporation has placed into service a tanker of modern construction, unique in many respects. The vessel is intended for coastwise, inland waterway and Great Lakes service. It was designed by the Gulf Oil Corporation's own marine department and was constructed by the Pennsylvania Shipyards of Beaumont, Tex.

The Paratex is equipped with no less than seven Diesel engines, two for propulsion and five for cargo-pumping services and for the generating of electric current.

The propulsion engines are the Alco-Sulzer type TM (marine type) reversible, 2-cycle, 4-cylinder, of 14-inch bore and 23½-inch stroke, delivering 720 bhp. at 277 rpm. In this installation, however, the engine speed is but 250 rpm. and hence the power output is 600 bhp. The two engines, totaling 1,200 bhp., impart a speed of 10 knots to the loaded tanker on a draft of 14 ft. The Alco-Sulzer engines are mounted side by side with a passageway in between, each engine being directly connected to its own screw.

The key-note of the power plant, and the entire installation in fact, is utter simplicity. The engines being of the 2-stroke cycle type, are directly reversible, making direct connected propeller drive possible. This eliminates reversing gears and avoids the more complicated and costly electric-generator motor drive. Yet, in spite of the manifest simplicity of the power

Two of the Superior Auxiliary Diesels.



plant and drive, the *Paratex* is exceptionally easy to handle, even in close quarters.

The control of the engines is of the utmost simplicity. There are but two levers, one regulating the fuel injection and hence the power resp. speed of the engines, while the other controls the starting, stopping and reversing. The engines employ the Sulzer system of scavenging, which also permits a slight amount of supercharging, since the intake ports remain open even after the exhaust ports are closed. While the exhaust ports are uncovered by the piston considerably later than the intake ports, the exhaust cannot escape via the intake ports, since the latter are provided with check valves which permit air to be delivered to the cylinders, but which will prevent the exhaust gases from entering the intake manifold.

The cargo of a tanker being fuel, the handling of the latter requires quick and efficient pumping service for both loading and unloading; and in addition to this, tanker services require abundant electricity not only for lighting purposes, but also for cooking and heating. For these manifold essential duties, the *Paratex* is equipped with five Superior Diesel engines. These engines are of the 6-cylinder, 65 hp., 4-cycle type, of 4½" bore and 5¾" stroke, operating at a speed of 1,200 rpm.

As stated previously, there are five such auxiliary Diesels placed within the hull of the *Paratex*. Four of these engines are directly connected to Waterous rotary cargo pumps, capable of delivering 700 gallons per minute. Two of the above mentioned Superior Diesels are also coupled to electric generators having an output of 40 kw. The power from the Superior Diesels permits simultaneous services for both fuel pumping, as well as the generating of electric current. However, when the Diesels are used for pumping services, the output of the generators drops to 20 kw., the balance of the power being required by the pumps.

The fifth Superior Diesel is designated as the "auxiliary generator pump unit"; it is complete with a 40 kw. generator and is also equipped with a Waterous general service pump.

The lighting service of the *Paratex* is from Edison storage batteries. Any one of the above mentioned Diesel-electric generators may be used for charging the Edison batteries, and in addition, the generators furnish current for the operation of a number of electric motors, such as:

For driving an Ingersoll-Rand air compressor for the starting of the Alco-Sulzer propulsion Diesels.

For operating a Waterous rotary pump for the engine room.

For driving a Carter centrifugal pump operating in the forward pump compartment.

To furnish power for a bilge-pump of 50 gpm. capacity.

For the operation of 3 Crane automatic water systems, consisting of pump equipment for the tanks furnishing washing water, culinary water and the water for the sanitary system.

In addition to the above electric motors installed within the hull proper, several electric motors are operated on deck — current being furnished by the above mentioned Superior Diesel-electric plants — which include —

A motor-driven capstan.

A watertight motor operating a winch by means of spur gears to handle dry cargo stowed in the forehold.

Electricity is also furnished for the heating of the pilot houses, for the four-foot automatic galley range, for the 30-gallon (electric) water heater, for refrigeration, for the electro-hydraulic steering gear and finally, for the Cory electric telegraph which is installed in each pilot house. Thus the Diesel-electric installations on board the *Paratex* serve a multitude of purposes.

The hull proper is of interest in that it is of all steel construction and electrically welded throughout rather than riveted. The hull, which has a straight stem and cruiser stern, is equipped with two continuous fore-and-aft bulkheads that extend from the top of the expansion trunk to the ship's bottom and pass through all cargo tanks, etc., and are extended aft through the pump room as strengthening members. These bulkheads divide each of the four main cargo oil tanks into triple tanks. The length over all is 257 feet 3 inches with a beam of 43 feet. The moulded depth at side is 17 feet 6 inches. The cargo capacity is 20,000 barrels, carried in four main triple tanks.

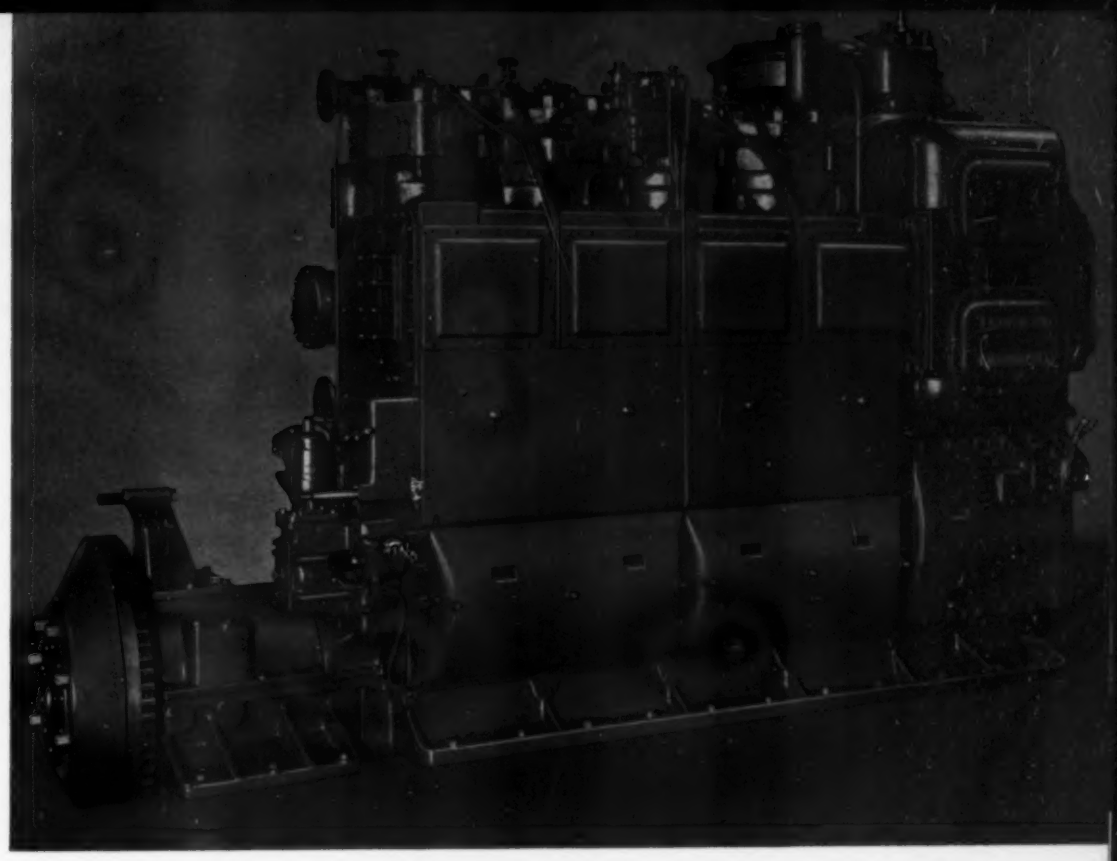
Modern vessels no longer feature the ancient

and venerable fo'c'sle and the adjacent "glory-hole" (crews' quarters to ye land-lubbers) so dear to "ye aulde marriners"; on the *Paratex*, officer and crew accommodations are in a neat steel house aft. These include living quarters, bathing facilities, galley and messrooms. The quarters as well as the engine room are heated by means of hot water during the inclement seasons and while on voyages in Northern waters.

To be unconventional, the *Paratex* is equipped with two pilot houses, one well forward and recessed in the forehold so that it can be lowered when the vessel must pass under a low bridge.

The method of mounting the pilot house on screws, enabling it to be retracted into a recess in the hold, is a necessary feature of large size vessels that wish to pass through the State Barge Canal. The *Paratex* has the additional pilot house added because of the fact that during the Winter months she will be used in Coastwise service which naturally requires operation at sea.

The second pilot house is located on the trunk about 87 feet from the bow. This pilot house, as mentioned above, is used at sea when the forward pilot house is retracted into the hold. This second pilot house is built in sections so that when the vessel is used in Canal service, it may be taken apart and stowed on the deck. A wing bridge extends to the vessel's side on each side of the pilot house. A duplicate set of control equipment is mounted in the forward pilot house and is, of course, available when operating in the Canals. The mast, which carries a boom for handling dry cargo, is built to hinge down for Canal operation.

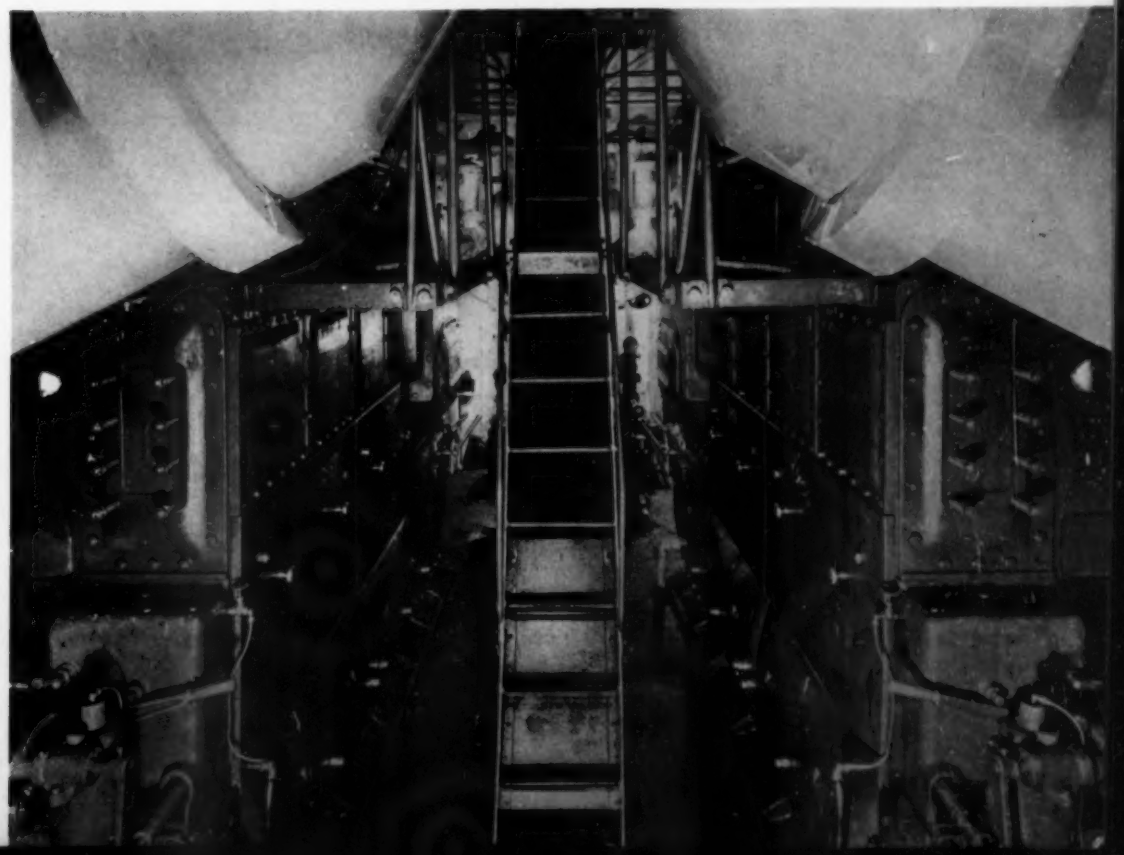


Alco-Sulzer Type TM, reversible, two-cycle, four-cylinder 720 bhp. unit.

The navigation facilities of the *Paratex* are commodious, they include electro-hydraulic steering gear, Cory electric telegraph, Typhon air whistle, hydraulic telemotors, engine transmitters and reply indicators, telephone Bludworth radio direction finder and the usual navigating equipment. The auxiliary equipment on board consists of a 100-cell Edison battery. A Sharples centrifuge is used on the lubricating oil. The Alco-Sulzer main engines are equipped with Maxim spark arresting silencers; two Crane automatic water systems, one for domestic water and one for sanitary service; and the Superior auxiliary engines are fitted with Vortex silencers.

All in all, the *Paratex* is a vessel arousing the interest of many a "salt" and Diesel engineer alike.

Illustration shows the two main engines on the tanker "Paratex."



PIONEERING

MARINE

44 large Diesel-powered ocean-going motorships are protected by Tide Water Diesel Oils.

AVIATION

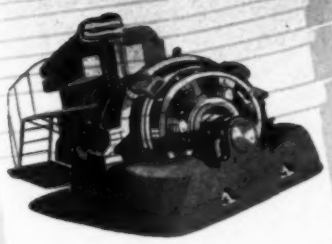
Over 200,000 Miles of Tide Water-lubricated Diesel operation in the air.

INDUSTRIAL
TYCOL
OILS-GREASES

TIDE WATER

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS SCIEN

AND PROGRESS

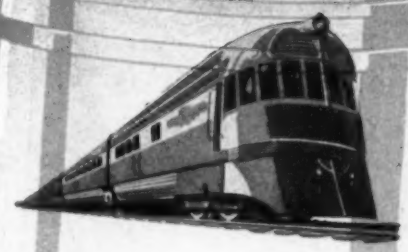


STATIONARY

21,000 hours on one of the most modern types of 525 H.P. stationary Diesels—typical of many Tide Water performances in this field.

BUSSES

Over 1,600,000 Miles of success in lubricating the first and largest fleet of Diesel-electric busses in America.



RAILROADS

Over 580,000 Miles of Tide Water lubrication on the "Flying Yankee," the first streamlined train in the East.

IN DIESEL PERFORMANCE

Tide Water has over thirty years of experience in the lubrication and actual operation of Diesel Engines. It started with the purchase, in 1905, of a Diesel Engine for pumping crude oil through Tide Water's pioneer pipe line—in the earliest years of Diesel operation in America. Tide Water was truly a pioneer—a leader in Diesel Engine lubrication performance.

Research and practical field experience have maintained Tide Water's leadership in this type of lubrication. Witness some of the record performances of today on the most varied and modern of Diesel Engines.

Operators everywhere find profit in the superior refining of Tide Water Diesel Oils. They are specially processed to maintain high stability and their freedom from harmful residues prevents costly piston ring sticking. RESULT: Maximum operation, less overhauls, lower maintenance cost.

Tide Water Refineries produce a complete line of Diesel Oils—in viscosities to suit every need. Let a Tide Water engineer prove that these oils will assure the most dependable and economical performance for you. Tide Water Associated Oil Company, Tide Water Division, 17 Battery Place, New York.

R DIESEL OIL

CIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

Three 225 hp. Buckeye Diesels installed in Julian & Kokenge Shoe Plant in Columbus, Ohio.

A SHOE COMPANY DIESELIZES

By GEORGE D. CROSSLEY

THE Julian & Kokenge Company, Columbus, Ohio, manufacturers of fine shoes for young women, such as the Foot-Saver and Dr. Locke shoes, has solved their problem of high power costs by installing a Diesel power plant.

Just about ten months ago, last June to be exact, they placed into service their new Diesel plant, which consists of three 225 hp. 9½" x 14" Buckeye Diesels rated at 400 rpm. direct connected to 150 kw. Electric Machinery generators, each equipped with rope driven exciters.

Previously their purchased power had been costing them an average of one cent, nine mills. Their average power cost now, including what they buy from the power company, is but seven mills.

Taking their January, 1938, costs as against their January, 1937, costs, the figures stack up this way. For January, 1938, they bought 5,170 kw. for $113.90 and generated 67,100 kw. for $435.59 – total cost for the month of $549.49 for 72,270 kw.

In January, 1937, they purchased 74,520 kw. for $1,083.85 – showing a difference of $534.34 – which in effect gives them a monthly saving of just half their previous power cost.

The actual cost of the Diesel plant operation for January, 1938, showed .00604 cents per kw. Their cost for that month approximated seven mills, including their purchased power.

Their present plan of operation calls for the Diesels to be on the line during the day only,

taking the entire load. At night they shut down the Diesel plant and throw in the purchased power line, because the night load varies so much – from a high of 50 kw. during the winter months to a low of 5 kw. during the summer months. However, the Diesels have proven so dependable, they are tentatively planning to discontinue all purchased power and install a small Diesel for night load and standby purposes.

The plant is in charge of N. S. Winnard, Chief Engineer, an experienced, resourceful, highly competent operator. With no previous Diesel experience, prior to the installation of the three Buckeye Diesels, Mr. Winnard took to the new plant like a duck to water. He superintended the erection of the new power house, the erection of the engines, the installation of the accessory equipment, etc., and he has now operated this plant for some ten months in a highly successful manner. His knowledge of the requirements of the big factory, gained by many years as its chief engineer, has enabled him to work this Diesel plant into the scheme of things with the least possible delay or disruption of manufacturing schedules.

Mr. Winnard has found the inherent simplicity of the Buckeye Diesel extremely useful in cutting down the amount of time actually spent in the engine room. Such items as the silent watchman which automatically warns against water failure or low water pressure; full pressure lubrication; sleeve cylinders; exhaust and intake manifolds not bolted to cylinder head; reversible shell type silver alloy bearings; individual fuel pumps for each cylinder and complete enclosure of the entire engine – all these tend to ease of operation, efficiency of operation.

The various accessories have been as well chosen as the main engines. Lube oil filtration is handled with a Skinner Streamline Filter which floats on the line, taking the oil from the base of each engine, passing it through the filter and returning it back to the engines. Approximately 150 gallons of lube oil are carried in the circuit. Mr. Winnard states "the engines are perfectly clean, the lube oil in circuit cannot be detected from new oil, as to body, color or original specifications. We confidently expect this filter to pay for itself the first year, by eliminating draining of the engines and filling with new oil. And, what is more important than all, keeping the rings and pistons free from sludge deposit, which insures against piston seizure. We blow the filter once every 24 hours and obtain about half a gallon of tarry residium of about the consistency of tar or roof paint, of no value to the engine as a lubricant, and which would simply clog up the engine."

The Julian & Kokenge Shoe Factory now successfully Dieselized.

About $14.00 worth of Lubal is added each month to the fuel oil and does an excellent job in reducing lube oil consumption and assisting in reduction of carbon and sludge formation.

Alnor pyrometers are installed on all three engines and supply efficient protection against over loading of any one cylinder, likewise signals a cylinder which may be laying down due to stuck fuel nozzles, etc.

The instrument board is complete with Roller Smith instruments and a General Electric voltage regulator. The three engines are on the line practically all the time and good frequency control and voltage regulation is obtained with the equipment installed.

On the engines themselves U. S. Gauge thermometers are installed on each cylinder and on the outlet water header. The patented Silent Watchman is a feature of all Buckeye engines and offers protection against water failure or low water pressure.

PuroDiesel lube oil used, a Pure Oil product and the fuel is supplied by the Ashland Refining Co. a 32-38 specification. A Curtis air compressor charges the Scaife air tanks and a Midget Levelometer records the amount of fuel oil in the main storage tanks. All in all a highly successful and well installed industrial Diesel plant.

General engine room view showing Alnor Pyrometers and patented Silent Watchman.

Exterior of Trailback, Mo., Diesel powered gin, equipped with International Diesel engine.

DIESEL ENGINES FOR GINS

By ORVILLE ADAMS

POWER for operating the South's 15,000 cotton gins is furnished by many thousands of Diesel engines, some steam and gas engines and purchased power. While the season is on during three or four months in the fall of the year, it is one of the largest power loads used by any industry in the world, the annual cost of which is conservatively estimated to be $10,000,000 based on an average crop of 15,000,000 bales. The equipment of the industry is undergoing constant replacement, changes and new installations, involving many hundreds of power units.

The demand for instant service day and night is met by the leading cotton gin operators by practicing modern methods and the installation of the latest type of machinery and power plants, and the majority of these power plants are Diesel engines as has been the case for nearly two decades. A couple of examples is illustrative of more than one hundred installations during the last couple of years.

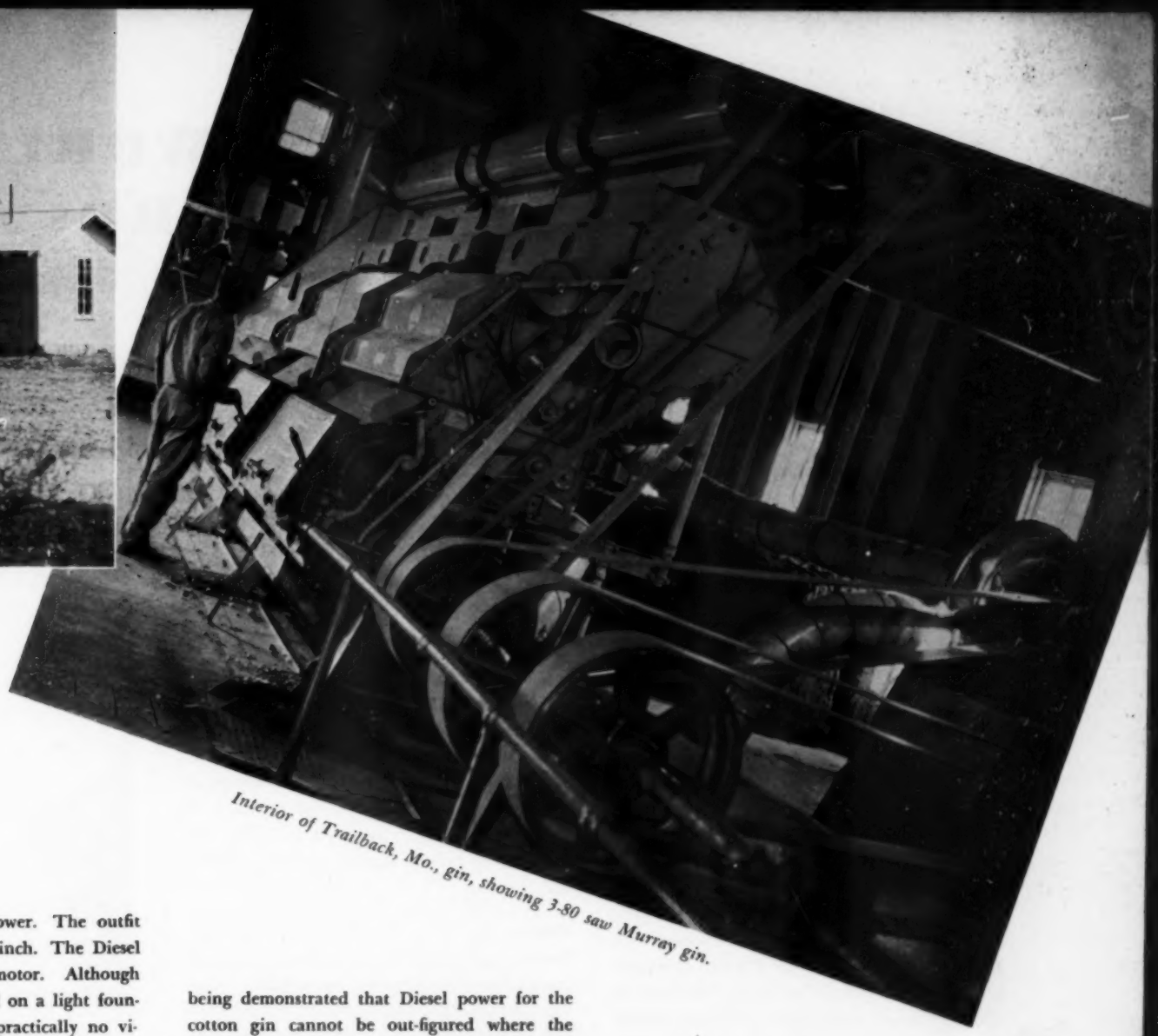
An International Diesel power unit installed in the new Trailback Gin, Trailback, Mo., made a record for economy that justified the investment of Mr. S. W. Barton of Lilbourn, Mo., the owner of the gin at Trailback, where he has just finished the season with around 3,000 bales.

The Trailback gin is what is known as a 3-80 saw outfit equipped with feeders, cleaners, and like auxiliaries. It is powered with a PD-80 Diesel driving the main plant, and a P-30 International power unit driving the unloading fans, etc. Relative to the economy of operation, Mr. Barton said, "We gin about 3½ bales per hour and the fuel consumption is about one gallon of fuel oil per bale ginned, the fuel costing us $.06 per gallon. We will gin around 3,000 bales this season." This is remarkably low cost for power, and is as low as the best records. This figures about $.06 per bale for fuel oil. To this is added the cost of operation of the smaller unit that drives the unloading fan.

The fuel consumption which Mr. Barton gave the writer; namely, one gallon per bale, indicates a very efficiently operated gin as well as an economical engine. The total horsepower required to operate a 3-80 saw gin with all equipment is usually given as about 79 hp. as the maximum power that would be required for the average gin fully loaded with long staple cotton. The power actually required to gin a bale of cotton depends a great deal on the rate of ginning per hour in the number of bales, the condition of the cotton and a number of other factors. This reduces itself always to the power consumption per bale.

Another typical installation is that of a Caterpillar Diesel engine rated at about the same horsepower, pulling a 4-80 saw outfit at Unadilla, Georgia, is turning out a bale of cotton on a gallon of fuel. Operating ten hours a day on 5½ gallons of fuel per hour, the gin turns out five bales per hour at a fuel cost of only $.06 per bale. The engine drives the gin through a flat belt transmission direct to the main shaft, the engine operating at 850 rpm. The gin is a Cen-Tennial Gin, owned by F. B. Calhoun, Unadilla, Georgia.

Another interesting cotton gin installation is found at the Salley Gin Co., Salley, S. C. Here is a Caterpillar Diesel engine running at 700 rpm. pulling four 80-saw gins equipped with



Interior of Trailback, Mo., gin, showing 3-80 saw Murray gin.

an air blast on the seed blower. The outfit has two fans, 40-inch and 46-inch. The Diesel replaced a 100-hp. electric motor. Although the new unit has been placed on a light foundation, it is operating with practically no vibration.

It may be interesting to note that between 75 and 100 Diesel engines have been installed in gins in the part of the cotton belt east of the Mississippi in the last year or so, even with the TVA power available in many sections where these engines are found. It is rapidly being demonstrated that Diesel power for the cotton gin cannot be out-figured where the volume of business per season and the efficiency of gin justifies the investment and the operation of the outfit in a particular location.

According to reliable figures gathered by the writer, the coming season promises many more than usual the number of new Diesel engine installations to replace obsolete equipment, steam engines and purchased power, as well as new installations, as a consequence of a large and profitable season just closed, which resulted in an improved financial condition in the industry.

Installation of a Caterpillar Diesel at the Salley Gin Co., Salley, S. C.

DIESEL BREAKS WORLD'S FLIGHT RECORD

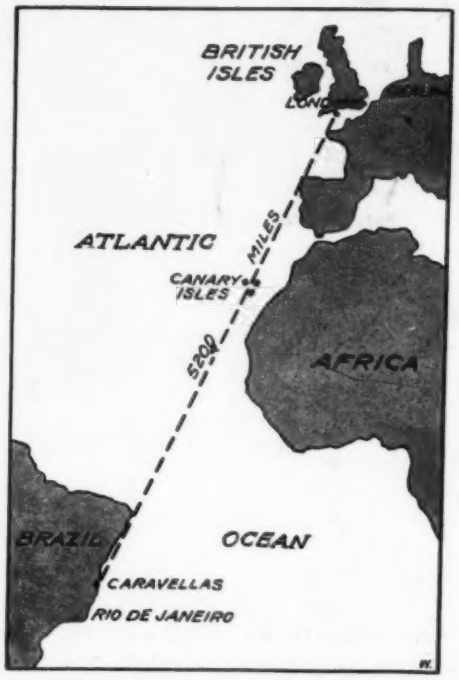
By PAUL H. WILKINSON

THE recent success of a Diesel-engined plane in breaking the world's long-distance seaplane record, is of great international importance. To the various nations now making strenuous efforts to equip themselves with planes and engines for transatlantic service, it is of particular significance. This fine flight confirms the contentions consistently made by the author for the past four years, that the Diesel is best for flights of this nature. It also indicates how handicapped a nation will be, if it is forced to rely upon the gasoline engine while other nations are using the Diesel.

The plane which broke the record, was a twin-engined Dornier *Do 18* flying boat, similar to the planes used by Deutsche Lufthansa for their transatlantic survey flights in 1936, and for their regular airmail service between the west coast of Africa and Brazil. The engines used were the well-known 600 hp. Junkers "Jumo" *205-C* Diesels which, in their improved form, showed the remarkably low fuel consumption of 0.34 lb. per hp. per hour. This also is a world's record, inasmuch as fuel consumption in flight as low as this is utterly impossible with the gasoline engine.

The flight began on Sunday, March 27, at 9.05 A.M. (E.S.T.), when the "D-ANHR" was catapulted from the Deutsche Lufthansa floating base "Westfalen" stationed off Plymouth, in England. It ended when the plane glided down into the harbor of Caravellas, in Brazil, on Tuesday, March 29, at 4.15 A.M. (E.S.T.). Approximately 5,200 miles were covered en route in 43 hours and 10 minutes flying time, at an average speed of 120 mph. Assuming that the two engines cruised at 75 per cent power output, they consumed 306 lbs. (or approximately 44 gallons) of fuel an hour between them, which would necessitate carrying a fuel load of at least 13,200 lbs. at the commencement of the trip. The weight of the Dornier *Do 18* flying boat, empty, is 13,200 lbs. and to this must be added 800 lbs. for the crew and their necessities. For a plane to be catapulted and fly at a gross weight of 27,200 lbs., carrying a disposable load in excess of its own weight, certainly is a fine achievement.

Officials of the F.A.I. (Federation Aeronautique Internationale) supervised the flight, as is usual for all record-breaking attempts of this nature. On board the plane were Flight Captain Hans von Engel, veteran of many a transoceanic flight; Pilot Gundermann, Dornier test pilot; and Radio Operator Stein and Flight Mechanic Rosel, who have taken part in many pioneer trips. Soon after the take-off, they encountered



Route flown by the Diesel-engine plane from England to South America.

head winds over the Bay of Biscay, but conditions improved and favorable trade winds accompanied them as far as the Equator. From there, side winds slowed them up somewhat and toward the end of the flight, bad weather and

The Dornier Do 18 flying boat equipped with Junkers "Jumo" Diesels which broke the world's long-distance seaplane record.

head winds again were encountered. The flight took them over the Canary Islands, the Cape Verde Islands and the Island of Fernando Noronha, and over the cities of Pernambuco and Bahia to Caravellas, 400 miles from Rio de Janeiro. Upon arrival, the crew reported to their headquarters in Germany: "Crew, aircraft and engines in the best condition."

This flight exceeded by nearly 850 miles, the 4,362-mile record won for Italy last December when Capt. Mario Stoppani flew to Caravellas from Cadiz. The best flight made by the United States in this category was a 3,281-mile flight from Cristobal, Canal Zone to San Francisco in 1935. It would be interesting now to know what one of Deutsche Lufthansa's large four-engined seaplanes could do in the way of a long-distance flight. The Hamburg *Ha 139* seaplane with its Junkers "Jumo" *205* Diesels normally has a range of 3,100 miles, so it is not improbable that it could start from Germany and fly non-stop to Buenos Aires, an over-water flight of about 6,500 miles.

With regard to the record-breaking flight, it is inexcusable that mention of the Diesel engines which made it possible should have been omitted from press reports released in the United States. This is not the first time that such information has been withheld, although it is difficult to believe that those who report or handle such matters, do not know the difference between the gasoline engine and the Diesel. This policy of ignoring the progress made in other countries so that our own shortcomings may go unnoticed, has little to commend it. Sooner or later, we must face the issue. If we wish to regain our position in world aviation, it is high time that the deficiency of our Diesel aircraft engine development program should be brought to light.

This deficiency in our aircraft power plant development becomes more and more apparent, the larger planes become. The recent call by Pan-American Airways for designs for 100-passenger airliners certainly emphasized this condition. The Pan-American proposal calls for aircraft with a payload capacity of 25,000 lbs., a cruising range of 5,000 miles and a minimum cruising speed of 200 mph. Stateroom accommodations must be provided for 100 passengers. Power plant requirements such as safety, economy and low cost of operation, however, apparently are left to chance.

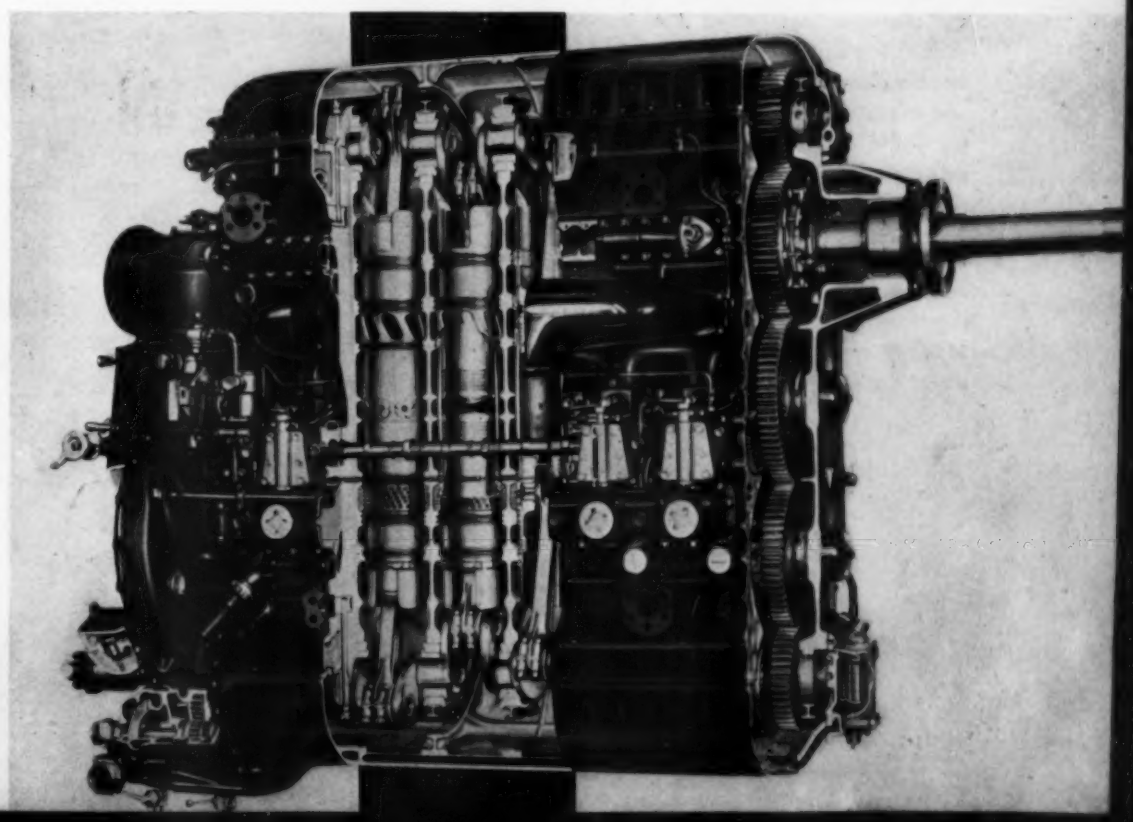
One of the most interesting designs submitted is that of the Seversky "Super-Clipper." This is a twin-fuselage machine with accommodations for the passengers in the wing, and twin pontoons which can be retracted in flight. It is estimated that it will carry a pay load of 43,000 lbs. and have a cruising range of over 5,000 miles at a cruising speed of 250 mph. Accomodations will be provided for 120 passengers and 16 crew. In modified form, as a "Super-Dreadnaught" of the air, it is said that it would be able to carry ten 2,000-lb. bombs and have a flight range of 12,000 miles at 300 mph.

Crew of the record-breaking plane. Left to right: Pilot Gundermann, Flight Captain Von Engel, Radio Operator Stein and Flight Mechanic Rosel.

As to power plants, it is proposed to have two forward (one in the nose of each fuselage) and one aft, each comprising two engines coupled to a single propeller of large diameter. In addition, there are to be two single-engine installations along the trailing edge of the wing. Each of the eight liquid-cooled gasoline engines is to be of 2,000 hp., developing 2,300 hp. for take-off. Assuming that the engines cruise at 70 per cent of their normal power, then 11,200 hp. would be used in flight. Assuming again, that the fuel consumption would be 0.45 lb. per hp. per hour, then 5,040 lbs. of gasoline would be required each hour, or 100,800 lbs. for a flight of 5,000 miles, as called for in the specifications. This weight of gasoline would require tanks of approximately 17,000 gallons capacity. If Diesel engines of equal power were available, there would be a tremendous saving. With fuel consumption not exceeding 0.36 lb. per hp. per hour, they would consume only 4,032 lbs. of fuel an hour, or 80,640 lbs. for a 5,000-mile flight. This would amount to a saving of 20,160 lbs., or 20.0 per cent, in the weight of fuel.

Airplane manufacturers are not to blame if they are forced to design their planes around gasoline engines which handicap them in this manner. Nor can engine manufacturers be expected to change over to the Diesel without adequate assistance. The fault lies with our government and its lack of foresight in planning a Diesel engine program.

Sectional view of the Junkers "Jumo" 205 Diesel, which has the lowest fuel consumption of any airplane engine in the world.



THE DIESEL-ELECTRIC PLANT AT BORDEN'S, NEW YORK

By B. J. VON BONGART

THE Borden Company, one of the largest milk producers and distributors, found that it would be able to generate electric current cheaper than it could be bought from the utility companies. Its New York branch at 49th Street and 11th Avenue, is one of eleven branches producing its own current for lighting and power.

Here, the power plant consists of three Cummins 6 cylinder Diesel engines of 4⅞ inch bore and 6 inch stroke, each directly coupled to Continental Electric 3 wire D.C. generators, operating at a speed of 1,200 rpm. and producing 240/120 volts at 125 amperes. The plant is illustrated in Fig. 1.

Milk is a product requiring the utmost care in handling, it being extremely sensitive to temperature, albeit the summer's heat has a more disastrous effect upon it than the winter's cold. In any event, either extreme must at all costs be guarded against.

The milk business on the other hand, is one of those 24 hour a day 365 day a year enterprises where activities never cease, which then means that neither power nor light may ever fail. At the above Borden branch, the three Cummins Diesels operate upon what may be termed a summer and a winter schedule. For the winter months – which also include the early spring and the late autumn – the Diesel-electric plant is called upon to furnish light and in addition to this, current for the charging of the storage batteries of some 36 electric delivery cars. See Fig. 1.

The capacity of any one of the three Diesel-driven generators is 40 kw., but the normal demand for light is approximately 35 kw., and the charging of the batteries requires another 35 kw. Whereas the light services are continuous, day and night every day in the year, the battery charging does not extend beyond 18 hours per day. Aside from the above, there are further demands for electricity. The main garage-hall, where the milk delivery cars are stored while the batteries are being charged, is heated by warm air circulated by means of a large fan, driven by an electric motor. The cooling water of the engines is circulated through a radiator and the above mentioned fan forces air through the radiator, thus reducing the temperature of the engine's cooling system and at the same time furnishing warm air for the heating of the garage-hall. The installation is shown in Fig 2.

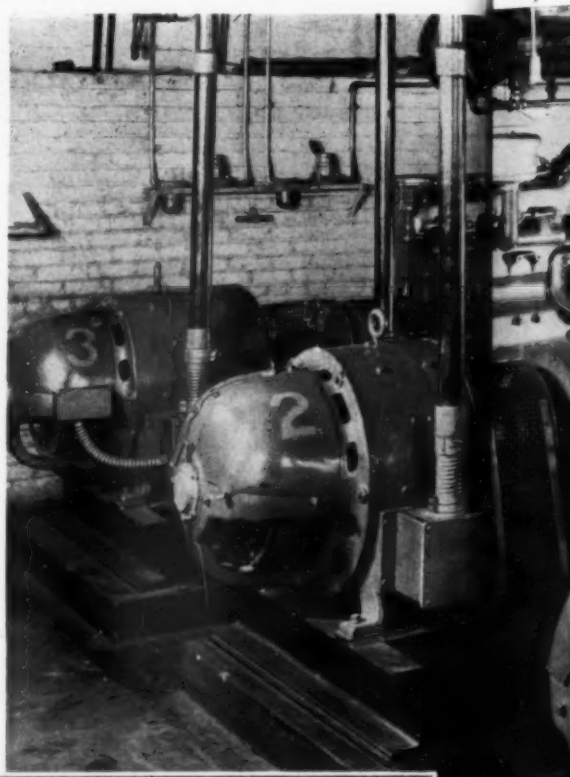
During the winter months, the operating schedule for the three Diesel engines is:

1 engine for 24 hours
2 engines " 18 "
3 " " 6 "

this necessitating operation of one of the three engines for 24 hours continuously, one engine for 18 hours continuously with a rest period of 6 hours, and the other engine operating for but 6 hours of service with a stand-by period of 18 hours.

The summer schedule, however, is far more severe. Then the Diesel engines must also provide power for driving a compressor of the refrigerating system, used for chilling the storage rooms, requiring that –

2 engines operate continuously for 24 hours
1 engine for a maximum run of .... 18 "



Current for charging the storage batteries of Borden's great white fleet of 36 electric delivery cars, one of which is illustrated, is furnished by the Diesel-electric plant.

This, then, is equivalent to continuous and uninterrupted service for 2 engines, allowing a stand-by period of but 6 hours for the third engine. This sort of a demand calls for unfailing performance, and at first, the Borden Company must have been slightly doubtful as to the reliability of its own electric plant, since it maintained a stand-by connection with the public utility, which, however, was never actually used. This trouble-free operation of its own electric plant has since convinced the Company that it could dispense with stand-by services and save the cost of maintaining an emergency tie-in that has proved to be utterly superfluous.

The Westinghouse control board of the plant

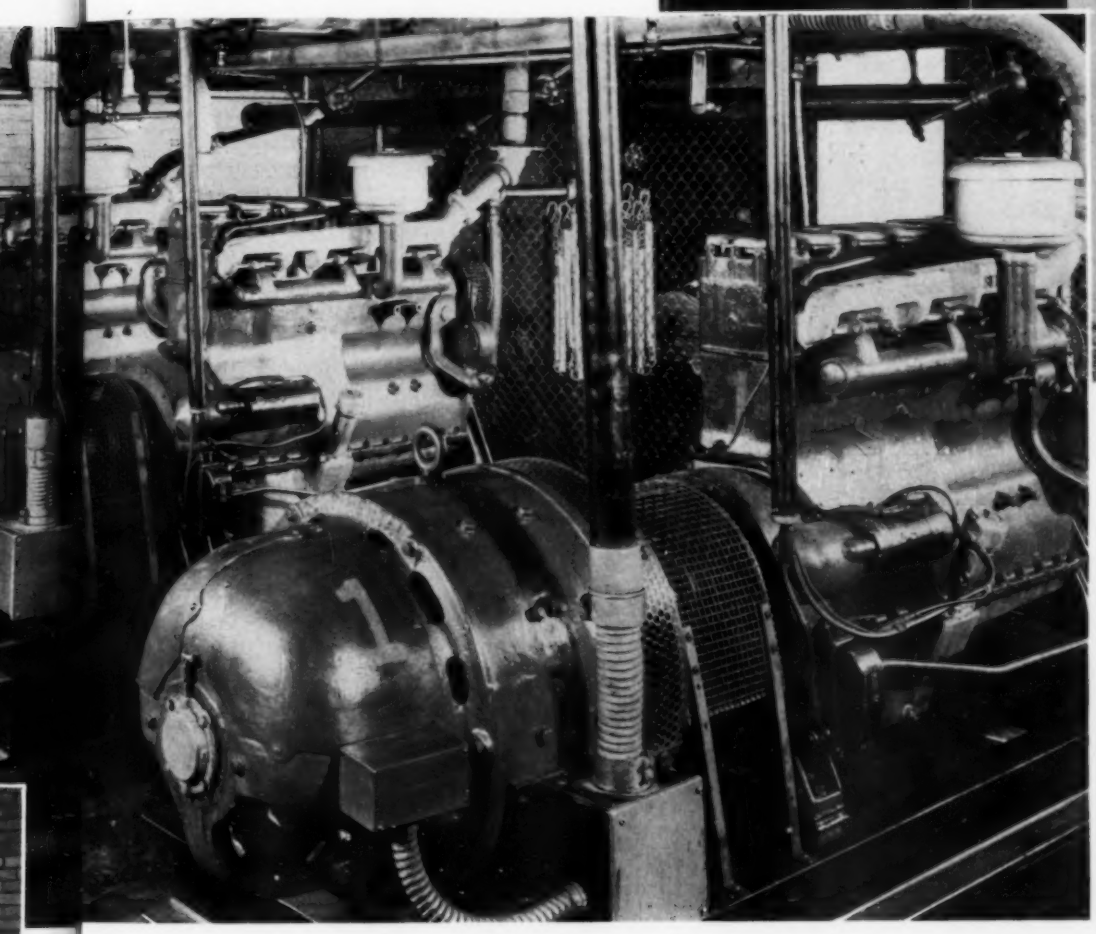


Fig. 1. Borden's triple Cummins Diesel-electric plant.

Fig. 2. Warm air heating method.

with Westinghouse volt and ammeters and a kilowatt hourmeter, is of a simple, clean cut, layout. The field rheostats for the generators are those of the Servas Electric Company. The plant is well engineered, the layout and the entire installation being executed by the Borden Company's own staff. The choice of 240/120 volts D.C. is particularly well suited for the demands made of this installation since the above potentials permit operation of electric motors at 240 volts, lighting services at the customary 120 volts, and also, and this is the main feature, the generating of D.C. obviates the installation of mercury arcs for the charging of the storage batteries. The plant is thus simplicity to the nth degree. In augmenting the output of one generator by the addition of that of another, it is merely necessary to maintain equal potentials – so that the two (or three) generators can take the load evenly – and synchronization difficulties, so often encountered by the inexperienced with multi A.C. generators, are non-existing here.

In conclusion it may be said that adequate and dependable lighting service is essential in any industrial plant. But in addition to this, a milk-bottling plant requires refrigeration so that the summer's heat may not affect the milk, since this precious food-liquid – so essential to the health of mankind – is subject to rapid spoliation if not properly guarded.

Refrigeration is thus essential for the summer months at the least, and it must be unfailing – milk cannot be trifled with. The Borden Company has placed its faith in the Diesel engine, and the latter has proved its reliability. Thus the Borden plant is a testimonial to the Diesel engine, its usefulness and versatility, but mainly – to its absolute dependability.

FLOOD RESTORATION WITH DIESELS

By SUE BARRETT

POETS have written of the Ides of March, the weather man has told us about March winds and we have had an occasional March Easter time, but Southern California has a new one: "The Waves of March."

When the clock ticked twelve and March began—old Jupiter Pluvius upset the Giant Dipper and spilled 12.66 inches of aqua pura in the first twenty-four hours of this eventful month to make an all time record for these parts.

This deluge was more than the fourteen storage dams in the vicinity of Los Angeles could accommodate, and on the third day the sun made its appearance and revealed some fifty million dollars damage with a loss of life equivalent to the total of a couple of months of traffic fatalities.

Since one record calls for another, Diesel power was outstanding in the immediate rehabilitation of the flood stricken parts. Millions of tons of debris was deposited on city streets and highways which had to be removed at the earliest possible moment and the spirit of the Los Angeles people arose to meet this emergency.

One of the outstanding examples of the quick application of adequate equipment was made by the Belyea Truck Company of Los Angeles, whose two Diesel tractors with Sterling dual chain, four wheel drive, pulling goose neck type low bed semi-trailers began moving huge shovels before the storm had abated and in 48 consecutive hours these two Diesel units transported 25 shovels and drag lines weighing each from 30 to 100 tons to points as far as 20 miles from the business district of Los Angeles and despite many land slides and over a hundred bridges having been washed out, by the end of the week all major traffic arteries were open.

The Belyea Truck Company operates over 300 pieces of equipment of all types and sizes and other outstanding performances of this well-organized trucking institution were the transportation of foodstuff and the U. S. Mail. Due to loss of several bridges and land slides in Cajon Pass, the Santa Fe Railway Co. could bring their trains only to Barstow—138 miles from Los Angeles. A telephone call to Mr. B. W. Belyea put 40 trucks and trailers on the road to Barstow by way of Mint Canyon and Palmdale. Many of these truck units were powered with Cummins Diesel motors which enabled them to make this detour to Barstow in an even shorter time than the train schedule. The old slogan of Uncle Sam's that the mail must go through still holds good—thanks to Mr. Belyea's Diesels and strange to say many of these powerful Diesel trucks passed over some of the same route used by the famous "Pony Express." Belyea provided the transportation and the Federal men the protection as all of these truck and trailer loads of Uncle Sam's mail were heavily guarded and well they were as one truck load consisted of over one million perfectly good American dollars—protected by some equally good machine guns, manned by Federal sharpshooters.

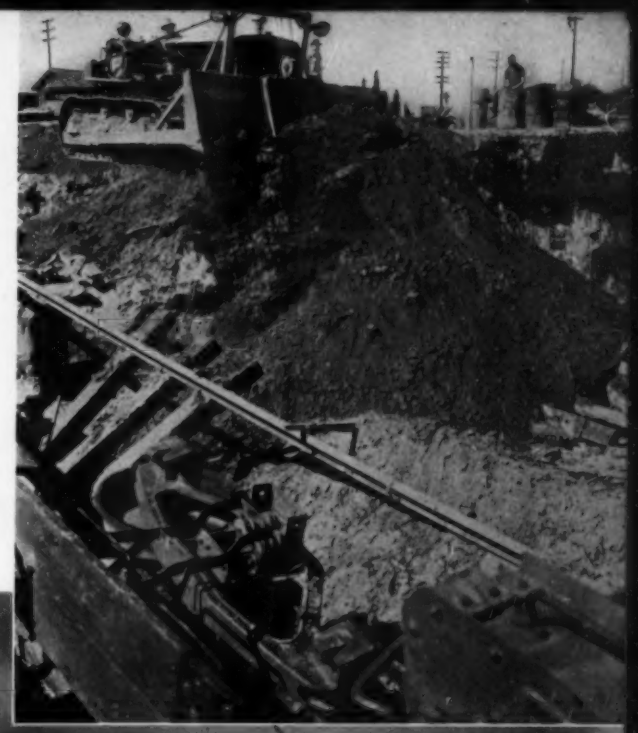
As one traveled over these places of destruction, it would seem that there was being waged a battle of power. Hundreds and hundreds of Diesel engines in Southern California in pumping plants, locomotives, road machinery and excavating equipment seem to have enraged

The P and H (left) and Lima (right) Diesel draglines at work on the Los Angeles River.

old Jupiter to the point where he was determined to demonstrate water power supremacy over this "newcomer" and after his powerful thrust, we hear the rat-a-tat-tat of Diesel power in counter attack.

Here a bridge is gone and a huge pile driver is pounding away rebuilding a foundation for a higher and stronger bridge. At the foot of Santa Monica Canyon, a shovel, bulldozer and road grader were mining for automobiles covered with mud.

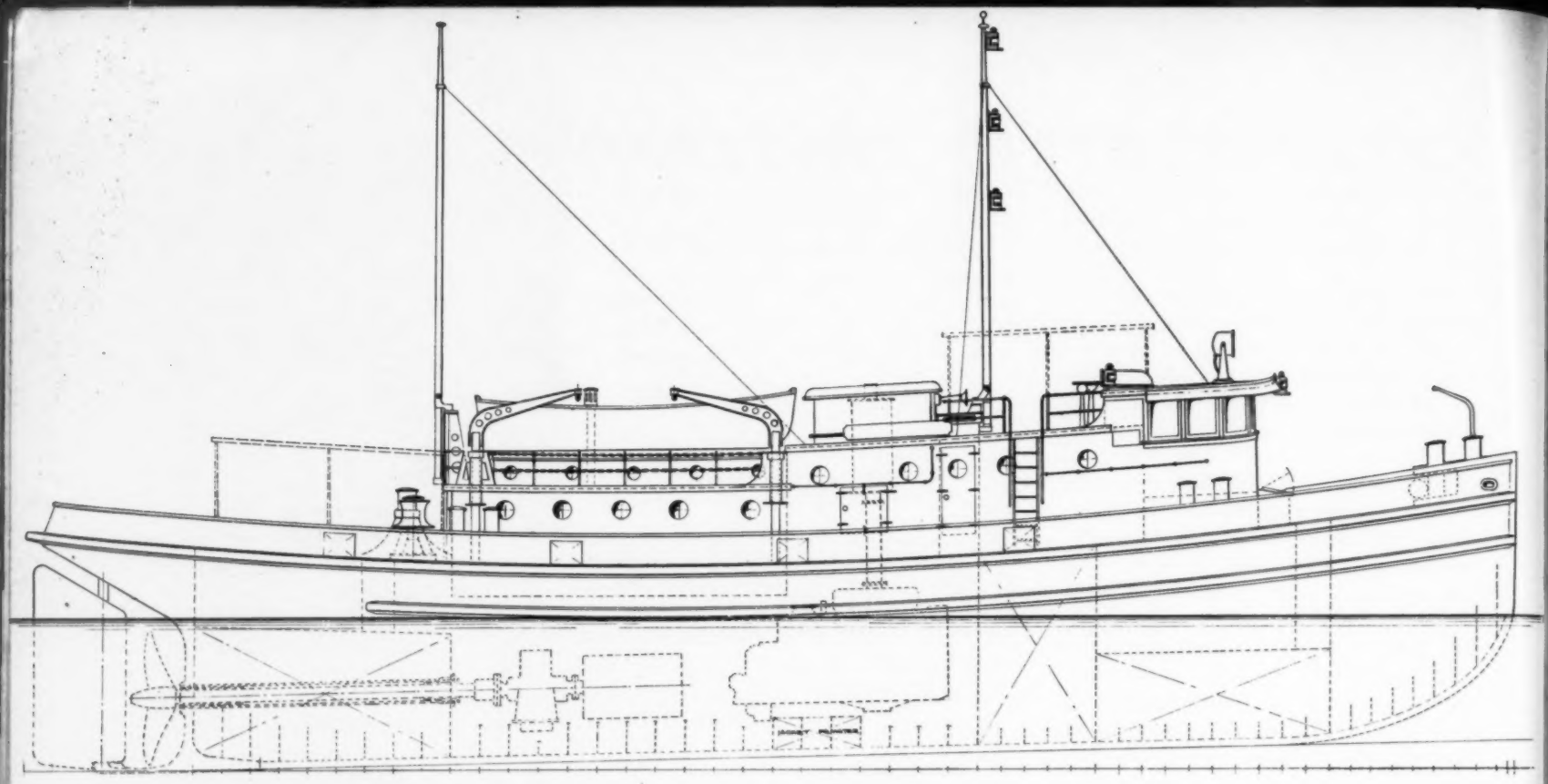
Fortunately, I never have observed a battle field with its horrors, but I did see the bucket and boom of a huge Bucyrus-Erie Diesel shovel poking itself through the sand as if to call for help and help was very near in the person of a Caterpillar Diesel bulldozer knocking down the newly made bank of the Los Angeles river within a hundred feet of this buried shovel, making a road for heavier equipment to rescue this wounded soldier. General Pluvius changed the channel of the Los Angeles river and submerged his arch enemy, this powerful Diesel, as well as part of the Southern Pacific Railway yard and several box cars. This lost ground was soon recovered as two big Diesel drag lines, a Lima on the west bank and a P & H on the east, immediately put the old Los Angeles river back in its place where the banks will be heavily fortified with hundreds of tons of rock with a heavy concrete facing which will defy any such raid in the future.



Right: Reconstruction scene, showing Griffith & Company's Caterpillar Diesel tractor and bulldozer, at Southern Pacific Railroad Yards, Colton, Calif.

Above: This Caterpillar Diesel tractor is operated day and night reconstructing demolished levee and highway between San Bernardino and Redlands, Cal.

Clearing debris from streets at Santa Monica Beach, Cal., with aid of Diesel tractor and dragline



GEARED ELECTRIC DRIVE

By A. W. CROUCH*

TWO of the most interesting tugs of recent years are under construction at the plant of the Defoe Boat and Motor Works, Bay City, Michigan, for the Moran Towing and Transportation Co. of New York. An important difference, as compared with the present Moran Diesel fleet, lies in the fact that these new boats will be equipped with geared Diesel-Electric drive, and this drive will incorporate late developments in marine engineering not found in previous Diesel-Electric installations.

Each of the two new tugs has an overall length of 94 ft. 4½ in., a beam of 25 ft., a depth of 12 ft. at the side amidship, and a designed draft of 9 ft. 6 in. The hulls are of welded steel construction and these vessels including the machinery and equipment are built to the highest classification of the American Bureau of Shipping. Two geared propulsion motors deliver 1,000 hp. to the propeller shaft and turn the 8 ft. 6 in., three blade propeller at 200 rpm. giving the vessel a speed of 13 knots. Current for these motors is supplied by two Diesel-generator sets of 400 kw. capacity each.

The design of the tugs was worked out on the boards of Tams Incorporated, naval architects, of New York, who are also supervising the construction. Like their predecessors, these tugs are intended for a type of service that imposes unusual restrictions on the designer, since they must combine the characteristics of three distinct types of towing craft. They must be fully capable of operation on the high seas, have the handiness and power of harbor tugs, that may be called upon to handle such ships as the *Queen Mary,* and must be able to operate in the New York State Barge Canal. This latter requirement imposes rigid restrictions on draft and on height above water line.

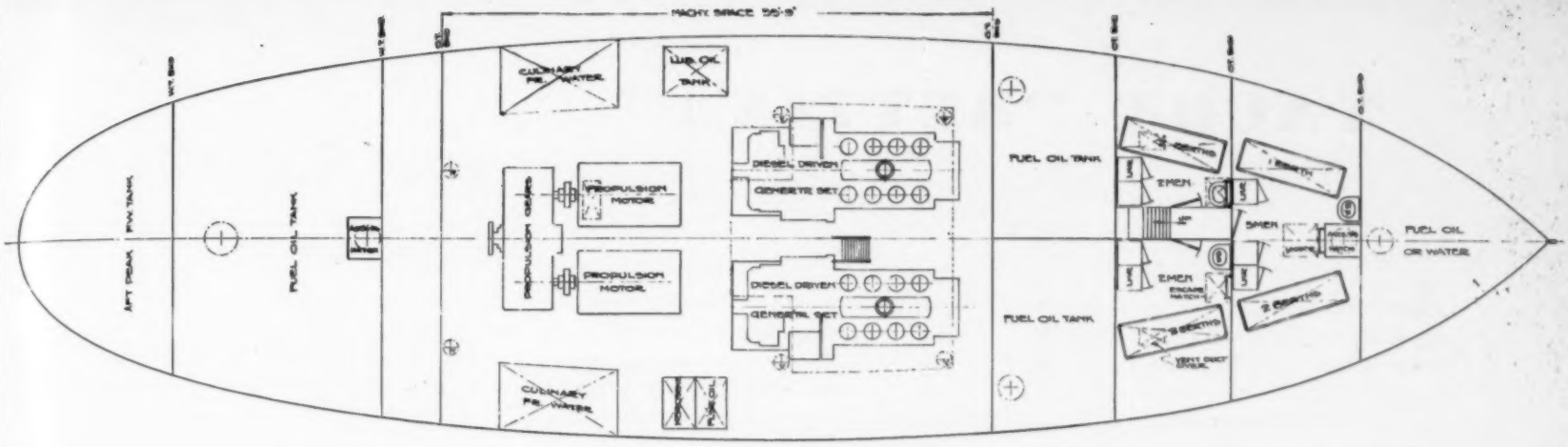
Reference to the accompanying plans will show how well the designers have combined these requirements in a general utility tug. Particularly interesting is the manner in which Diesel-Electric drive, utilizing high speed, compact Diesels, has been combined with reduction gear drive, using small, high-speed motors, in a manner excellently adapted to the requirements of this particular job.

It may be seen that the very low height of main propulsion units permits the use of a complete deck over the engine room, with quarters arranged about passages that permit access to all interior compartments, with only one door on each side and one door in aft end of deck house. The profile plan shows how the general arrangement meets the requirement for low height. The pilot house is elevated above the deck house only enough to make room for rear vision windows. Aft of the pilot house, on top of the deck house, is a navigating bridge, with steering wheel and engine controls, for use in Canal navigation. The exhaust stack is low, and abaft the stack the top of deck house is dropped to make room for a lifeboat. Head room for quarters in this part of the deck house is obtained by the use of a deck dropped below main deck level from the aft end of deck house to a point approximately amidship.

Tracing a course through the deck house from the door at aft end we step down into the galley, a roomy space occupying the full width of deck house. In addition to a Webb-oil-burning range, and a combined refrigerator and mess table, it has the usual sink, dresser, etc., and a specially designed water heater which utilizes the heat from the galley smoke pipe.

A door in forward bulkhead opens into a fore-and-aft passage, with a double stateroom, for two engineers, on port side, and a single stateroom for the chief engineer to starboard. Forward of these rooms are two wash rooms, one on each side. Steps at forward end of passage

Chairman of the Board, Tams, Inc., Naval Architects



lead up to a door opening to a space which contains two toilets, and a fiddely over the engine room. A ladder from the fiddely grating gives access to the engine room, and a door on each side of the forward bulkhead of the fiddely, one port and one starboard, open into an athwartship passage, with a door at each end opening on to main deck. Another fore-and-aft passage leads forward, with a double stateroom, for two mates, on port side and a single room for the captain on starboard.

The main power units consist of two General Motors, Vee-type, eight cylinder, 2-cycle Diesels, each rated 600 hp. at 750 rpm., each driving a General Electric, 400 kw., 250-volt generator and a 25-kw., 125-volt generator, the latter for excitation and auxiliary power. The main generator is direct connected and turns at engine speed but the exciter is counted over the generator and multiple belt driven at a speed of 1,800 rpm. The exciter is of the constant voltage type, the output being constant over a range between 900 rpm. and 1,800 rpm.

The propulsion unit consists of two 500-hp. G. E. motors of the single armature type, combined with a Farrel Birmingham reduction gear and thrust bearing. The gear ratio is arranged to give the propeller a speed of 200 rpm. with the motors turning at 1,200 rpm.

Four control stations are provided, one each in the engine room, in the pilot house, on the bridge abaft the pilot house, and at aft end of deck house. At each of the three deck stations is an operating pedestal, controller, speed indicator, and signal lights, while in the engine room is the main control panel with the various switches, rheostats, meters, etc.

A feature of the control system is that only the 125-volt circuits are located on the control panel. The main cables, which carry 250 volts, lead directly from the generators to the propelling motors, the generator switches, being mounted on the generator frame, in a sheet metal case. The door of the case is interlocked with the excitation contactor, so that opening the door removes the voltage from the contactor and the switches cannot be energized until the door is closed.

The speed of propelling motors is regulated by cutting in an out resistor units in series with the main generator fields, thus varying the generator voltages. Moving the controller lever through the off position reverses the generator fields thus reversing the current and the direction of rotation of the motors.

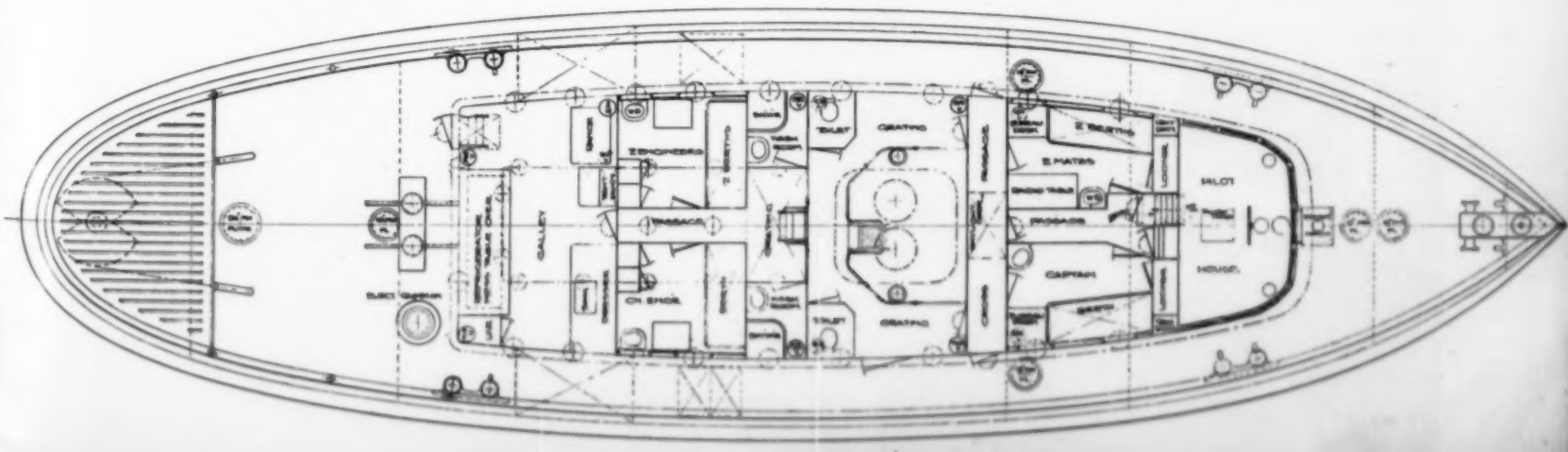
Since each generator requires but 2½ kw. for excitation the 25-kw. exciters supply ample current for auxiliary needs throughout the vessel when either or both main engines are running, and the only auxiliary generating plant needed is a 30-kw. Diesel-generator that can be used for standby service or may be used to excite the main generators if necessary.

This auxiliary set is of interest as representative of the recently announced General Motors "packaged power." It consists of a Model 3-71, three-cylinder, Diesel, mounted as a unit with the G. E. generator and all pumps, coolers and other accessories. The engine is radiator cooled, with radiator and water tank attached, so that the set requires no water connections and is ready to run when placed on its foundation. The engine is of the 2-cycle type, as fully described in our February issue, and is rated 45 hp. at 1,200 rpm. and 70 lb. brake mep.

A feature not usually found on Diesel vessels of this size is the use of electric starting for the engines and the elimination of starting air compressors. Exide storage batteries are provided for starting both main and auxiliary engines, the generators on main engines being used as starting motors and the usual automobile type starter being used on the auxiliary unit.

One of the interesting pieces of equipment in the engineroom is that of the Youngstown Miller oir purifier which is designed to re-refine the lubricating oil of both main engines and auxiliary engnes, so that not only are all solids and free and extrained water removed, but the oil is returned to its original color. Moran Towing & Transportation Company are using one of these units very successfully in one of their older vessels and specified a Youngstown Miller oil purifier for each of these new tugs.

It is certain that these two tugs will attract widespread attention in New York Harbor and tributary waters, in which territory the necessity for the early replacement of a large number of obsolete towing vessels makes tugboat design a matter of keen interest. Direct Diesel drive, Diesel gear drive and Diesel-electric drive for this type of vessel each has its ardent champions, but there is no doubt that the latter form of propulsion has improved its position by the introduction of the geared propulsion motor.



YACHT "BETTINA"

By JOHN W. ANDERSON

AN interesting Diesel powered motor yacht named the *Bettina* has just recently been delivered to William Pierson Hamilton from the Annapolis Yacht Yard, Annapolis, Md. Designed by Nelson and Reid of New York, it is an interesting example of the safety and economy that can be packed into the 54 ft. boat along with luxurious comfort and beauty.

The illustrations give a good idea of the quarters, the navigating station, and of the exterior appearance. The principal dimensions of the yacht are 54 ft. overall length, 12 ft. 10 in. beam, and 3 ft. 9 in. draft. The hull has oak keel and oak frames. It is double planked, with the inner planking of white cedar and the outer planking of Philippine mahogany. Everdur bronze screws are used for fastenings. The side decks and cockpit floor are of teak, while the deckhouse and trim are of Honduras mahogany.

One of the features of the boat is the unusually large deckhouse, which provides an enclosed dining room and living room with large windows on three sides. Aft there is an open cockpit with a standing roof over it. There is plenty of open deck space forward for working the ground tackle; and the navigating bridge is just aft of the deckhouse. The propelling engines are controlled from this bridge and the photo shows the Diesel engine gauge-board and controls as well as the navigating equipment.

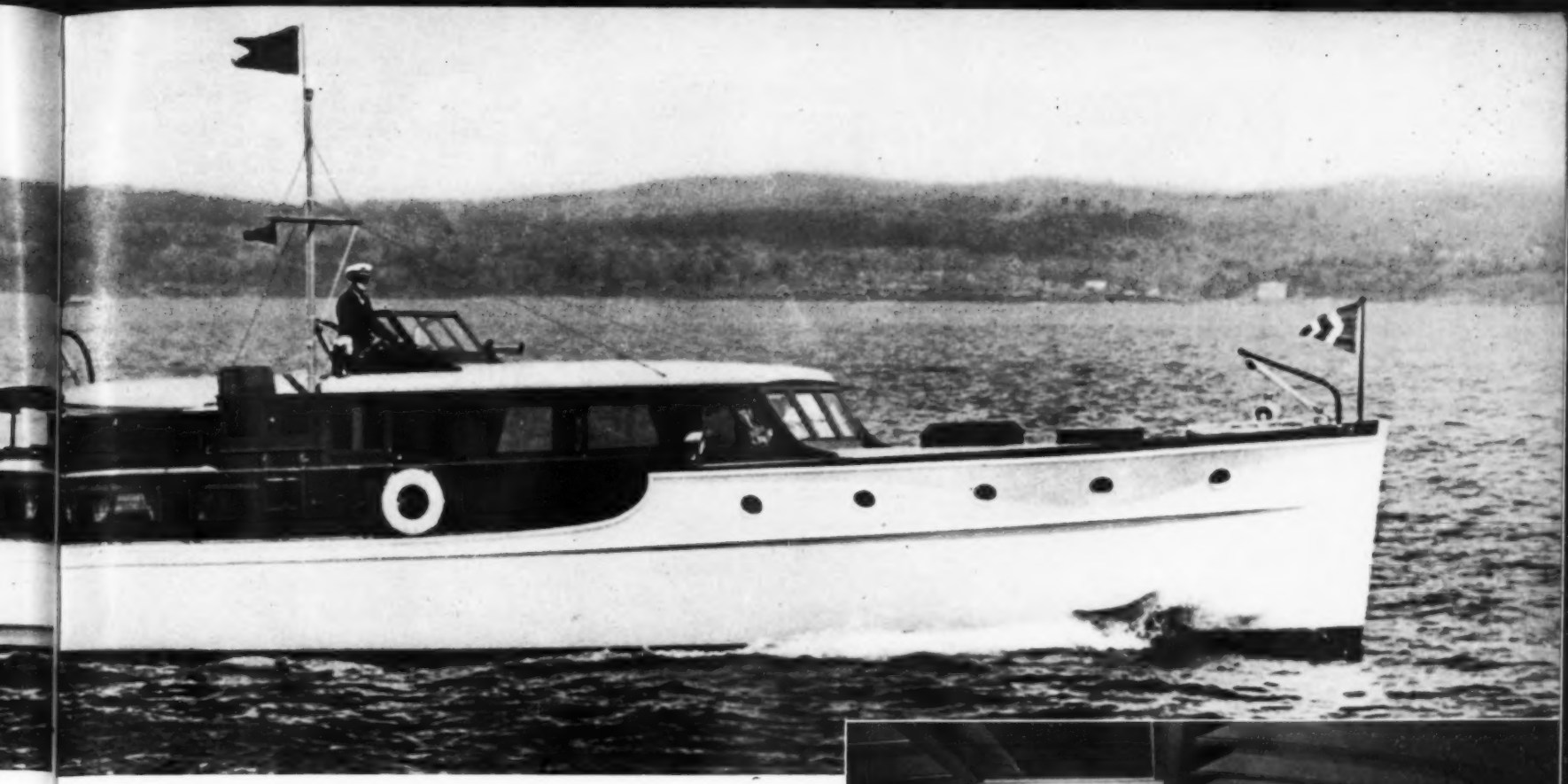
The crew of two are quartered in the forecastle forward. The engine room is directly below the deckhouse, and it is thoroughly isolated from the adjoining sections against transmission of heat or noise by Johns-Manville insulation. Aft of the engine room are the galley on the starboard side and the stateroom with two berths and the bathroom. The interior of the galley is covered entirely with stainless steel so that no woodwork is exposed.

The engine room is reached from the deckhouse space through a hatch. In addition, there are large folding flush hatches directly over the engines for use during heavy repairs. The twin screw engines are Superior Model A eight cylinder Diesels rated at 150 bhp. each. Built into each unit at the after end are a marine reverse clutch and a 2 to 1 speed reduction gear. The two-inch Tobin bronze propeller shafts are carried in Goodrich cutless rubber bearings in the specially cast V type struts. There are twin Dagger type rudders. Propellers are 28 in. by 30 in., and the top speed of the boat is 20 miles per hour. It is interesting to note in passing that similar boats fitted with the same engine power and direct drive to the propellers make only 18.6 miles per hour.

The fuel oil tank is way aft under the cockpit floor, and has a capacity of 420 gallons. At the normal cruising speed of 15 miles per hour, this boat has a cruising radius of 600 miles.

The Diesel engines are self-contained power units and, as already mentioned, are controlled entirely from the navigating bridge through Bendix controls. The engines are started by attached electric starting motors, and the energy for these is obtained from the 32-volt Exide storage battery. This battery is charged by the generators attached to the Diesel engines. But the battery also serves as the source of electric power for electrical services.

The boat has electric lights, a searchlight, an electric signal horn, motor driven bilge pump, motor driven sanitary pressure pump, and a motor driven drain pump for the showers in



the bathrooms. Running hot and cold water is piped to all showers and basins. The hot water is supplied from a Shipmate heater.

The Diesel exhaust is carried out through flexible steel hose to Maxim silencers, and out through the stern. It has proven to be quieter than the exhaust from gasoline engines. In other words, the change to Diesel power has brought all of the advantages of economy and safety without disadvantages of noise or odor.

The captain of the boat acts as the engineer, and usually he takes a brief course at the engine builder's factory to become thoroughly familiar with these engines before taking command of them.

"Bettina" under way is a delight to the ear as well as the eye. Interior views illustrate how beautifully she is appointed.

The flying bridge (extreme left) affords the helmsman unrestricted view in all directions and places 100 per cent control at his finger tips.

FOR NAVAL ARCHITECTS ONLY

Gray Marine Diesel Details

NAVAL architects and shipyards are naturally interested in details of the new line of Gray Marine Diesels, hence we have gathered together the data most necessary in working these new engines into both new and old boats.

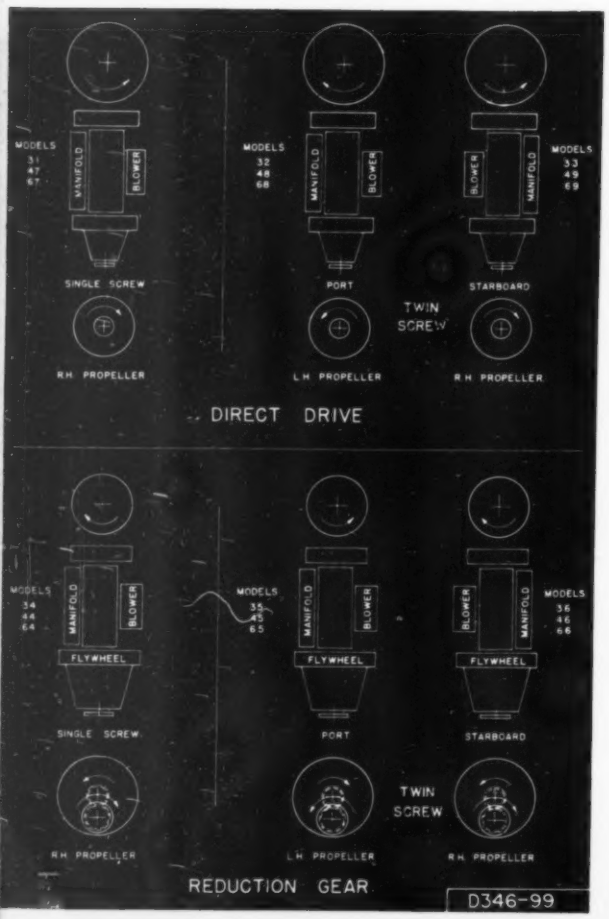
Gray Marine Motor Company is one of the oldest and today one of the largest in the gasoline engine field. That they have decided to bring out a line of Diesels is important news of interest to all of us.

Gray is now in production in a full line of marine Diesels of the two-cycle type, a detailed description of which appeared in our February issue on pages 26-27-28-29-30. Ratings and principal dimensions appear hereunder.

Model	Hp. at 2,000 rpm.	Length Direct Drive	Total Weight	Weight per hp. at 2,000 rpm.
3 cyl.	85	48½"	1,650	19.4 lbs.
4 cyl.	110	60½"	1,900	17.3 lbs.
6 cyl.	165	72⅛"	2,250	13.7 lbs.

A single cylinder 22 hp. engine will be shortly added to this series, thus offering capacities from 22 hp. up to 165 hp. in one unit.

One of the most interesting features of this line of two-cycle Diesels is the flexibility of arrangement in a boat which the design permits. The sketch herewith illustrates how this series of engines can be readily adjusted for inboard or outboard operation. This sketch shows how manifolds can be installed inside or outside, how various accessories can be placed inside or outside, at the will of the naval architect or shipyard or owner.



The design inherently permits a number of very useful and often vital switches of accessories or equipment. For instance, the design permits either rotation of the crankshaft. The reverse gear or marine transmission can be placed on either end of the cylinder block, so that every possible combination of manifold location and propeller rotation is available without the use of special parts or later service problems.

Standardization of Working Parts. All cylinders in the series are the same size, 4¼" bore by 5" stroke. This means a complete standardization of such parts as cylinder liners, pistons, connecting rods, main bearings, valves, unit injectors, rocker arms, valve springs, accessory drive gears and bearings, and many others. These parts, therefore, will be lower in price due to large production, easily stocked by service depots, and servicing will be easy and inexpensive. Similarly, the appearance and arrangement of the various engine sizes are the same, and so are the important dimensions such as base depth, support centers, total width, height —in fact, everything but length, thus simplifying tne architect's and builders' problems.

Since all wearing parts of the Gray Marine Diesels are replaceable, they should have an extremely long life at a minimum of expense.

Fresh Water Cooling System is standard on all Gray Marine Diesels. This brings three major improvements in operation and safety to the owner. First, it permits positive thermostatic control of the operating temperature, insuring proper lubrication, longer life and better fuel economy. Second, it prevents salt-water corrosion of the cylinder block and head. Third, because the waterjackets are kept full, the engine is protected against cracking due to a "dry start."

The enclosed cooling system is extremely simple, consisting of a small expansion tank, a Harrison heat exchanger unit of suitable size, and a gear-driven circulating pump. An extra gear-type seawater pump is also supplied, as is the necessary piping and the thermostat. It is only necessary to keep the system full of pure water, or suitable anti-freeze mixture, and to clean the heat exchanger occasionally if running in sand or weeds. The cooling system units are very small, since the Gray Marine Diesel rejects, or loses, only about half as much heat per hp. as a gasoline engine—thus showing its extremely high thermal efficiency.

Accessories. In addition to the cooling system, Gray engineers have included the following items in standard Diesel equipment:

Lubricating oil cooler
Lubricating oil filter
Fuel oil filter (dual type)
Intake air silencers
Governor for idling and overspeed
Base clean-out plates (each side)
Handy flywheel pulley
Instrument panel with bronze body, tachometer, oil gauge, water and oil temperature indicators, and ammeter.
Hand cranking bar (for timing)
Coupling
Reverse lever
Detachable support feet

Electrical Equipment includes 32-volt starter and 250-watt, 32-volt generator, which are standard, with higher generator capacities up to 1,500 watts available. The larger generators are equipped with voltage regulation. All starters have a heavy-duty solenoid relay switch, with an ample 32 v. starting switch included in the loose equipment.

Operation. Knowing the importance of smoothness and quietness in boats, Gray has paid particular attention to these qualities throughout the design. Engine forces are completely counter-balanced. The exact control of fuel injection by the unit injectors goes far to

eliminate inherent roughness, and the results are extremely good. Tests made in a twin screw boat, with one Gray Marine Diesel and one Gray Marine six-cylinder gasoline engine side by side, revealed no advantages in smoothness for either, and the Diesel, pulling the same power, ran almost as quietly. No smoke or smell has so far been noticeable in hundreds of hours of running.

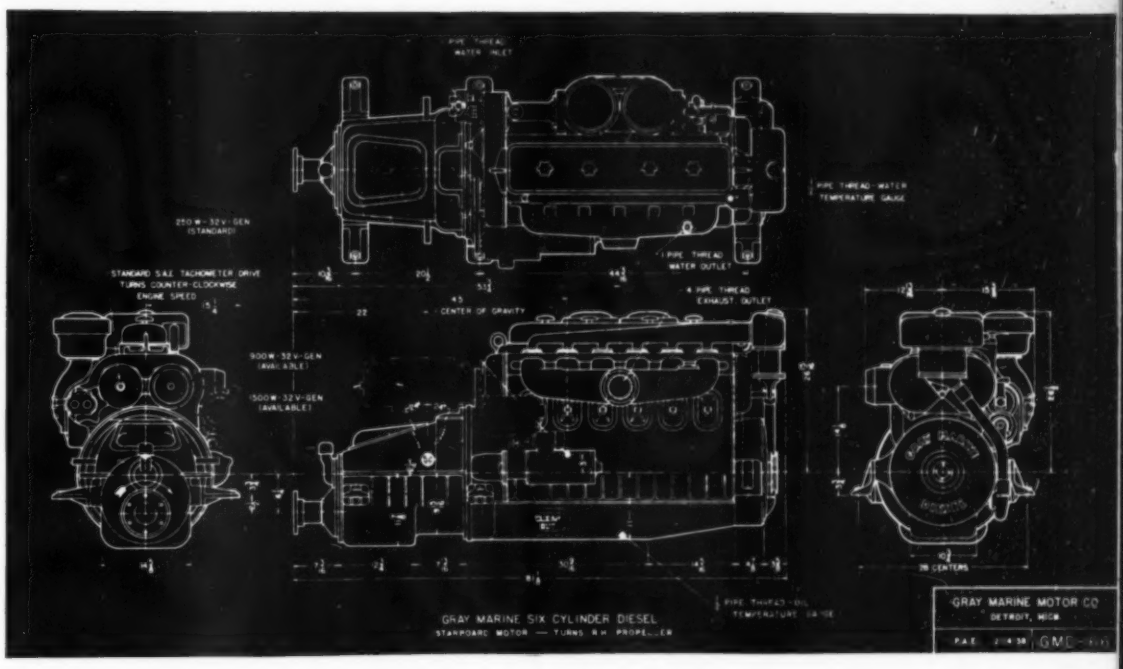
The engine seems not to be sensitive to fuel variation, provided the fuel is clean. Best results are obtained from the use of No. 1 or No. 2 furnace fuel. Consumption figures are given as .44 to .45 lbs. per horsepower hour. No special lubricating oils are required—any high grade oil of 30 viscosity suitable for gasoline engines may be used.

Transmission. For direct drive, Gray Marine Diesels are equipped with a very large oversize transmission of the conventional marine type. For reduction drive, a special adaptation of a thoroughly proven and well known design is used. This gives:—

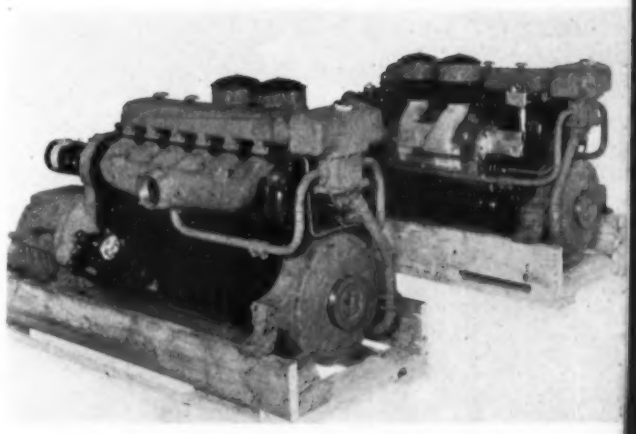
(a) Drive ratios from 1.5:1 to 3:1 reduction.
(b) 100% reverse ratio for all drive ratios.
(c) A positive neutral, which may be used as a sailing clutch, without heating the oil.
(d) Complete accessibility and removal without disturbing the engine.

Gray Marine Diesel Model 66. This is the six-cylinder, 165 hp. engine, with reduction gear transmission, showing the arrangement suitable for the right hand engine of a pair, turning the propellers "outboard," with the exhaust manifolds "out." The opposite arrangements are also available. This view best shows the simplicity and accessibility of the design, and its extreme compactness. Rated at 165 hp. at 2,000 engine rpm., a 3:1 ratio reduction would supply 160 hp. at 666 shaft rpm. in an overall length of 81⅛". The total weight, as shown, is approximately 2,600 lbs.

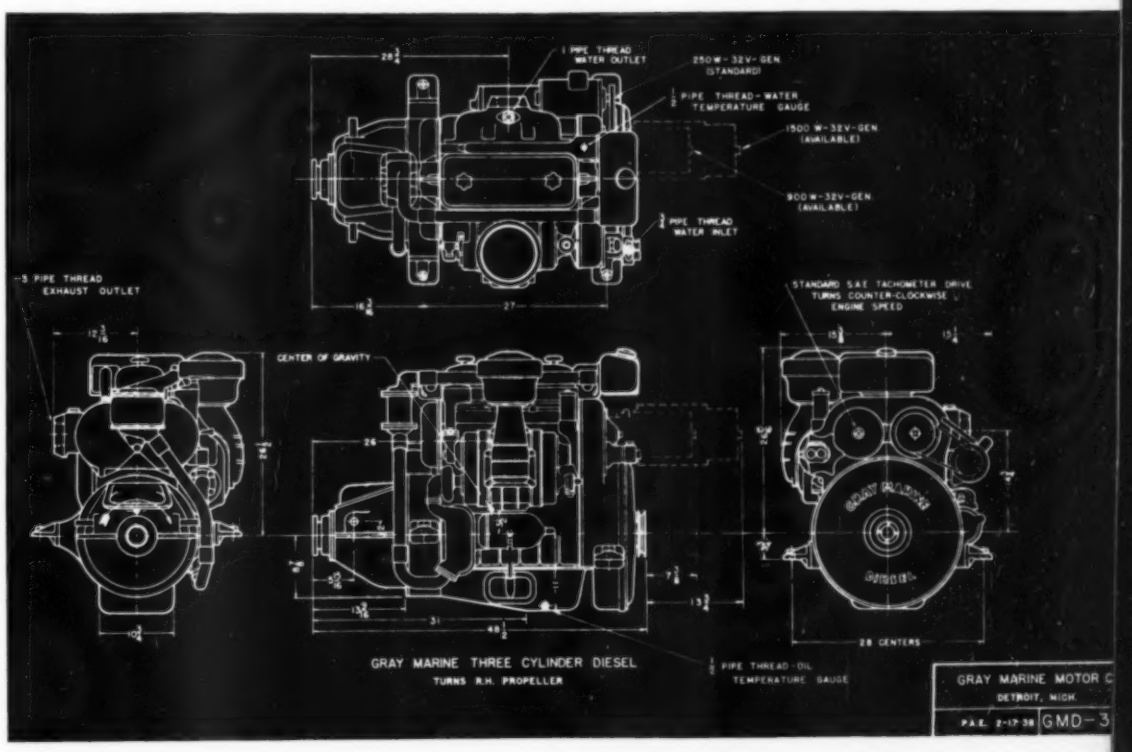
Gray Marine Diesel Model 31. This shows the standard arrangement known as Model 31, for single screw installation with exhaust manifold on port side, to run right hand propeller, direct drive. The rotation may be changed without change in arrangement or appearance. The engine can also be built with manifold on starboard side, turning either right or left hand propeller. Thus, pairs are available with manifolds, either "in," or "out," turning the wheels either "inboard" or "outboard." The same options are available on the "FOUR" and the "SIX."


PIPE THREAD WATER INLET
250 W - 32 V - GEN (STANDARD)
STANDARD SAE TACHOMETER DRIVE TURNS COUNTER-CLOCKWISE ENGINE SPEED
900 W - 32 V - GEN (AVAILABLE)
1500 W - 32 V - GEN (AVAILABLE)
1 PIPE THREAD WATER OUTLET
4 PIPE THREAD EXHAUST OUTLET
CENTER OF GRAVITY
1 PIPE THREAD - WATER TEMPERATURE GAUGE
1 PIPE THREAD - OIL TEMPERATURE GAUGE
28 CENTERS
GRAY MARINE SIX CYLINDER DIESEL
STANDARD MOTOR — TURNS R.H. PROPELLER
GRAY MARINE MOTOR CO
DETROIT, MICH.
P.A.E. 2-14-38
GMD-6

The generator shown is in the position required for units up to 1,500-watt capacity. The smaller standard (250-watt) unit is belt-driven and mounted on the flywheel housing, where it does not increase the length. This applies to all models. The other accessories shown are all standard, and include the heat exchanger and expansion tank of the inclosed fresh water cooling system, the oil cooler, oil filter, intake silencer, governor housing, base cleanout plate, seawater pump, and extra pulley in flywheel. Model 31 weighs 1,650 lbs. fully equipped, as in the drawing.



A pair of Gray Marine six-cylinder Diesels.


1 PIPE THREAD WATER OUTLET
250 W - 32 V - GEN (STANDARD)
1/2 PIPE THREAD - WATER TEMPERATURE GAUGE
1500 W - 32 V - GEN (AVAILABLE)
900 W - 32 V - GEN (AVAILABLE)
3/4 PIPE THREAD WATER INLET
3 PIPE THREAD EXHAUST OUTLET
STANDARD SAE TACHOMETER DRIVE TURNS COUNTER-CLOCKWISE ENGINE SPEED
CENTER OF GRAVITY
28 CENTERS
GRAY MARINE THREE CYLINDER DIESEL
TURNS R.H. PROPELLER
1/2 PIPE THREAD - OIL TEMPERATURE GAUGE
GRAY MARINE MOTOR C
DETROIT, MICH.
P.A.E. 2-17-38
GMD-3

S. A. E. NEWS

INTEREST in the well-balanced Diesel engine program scheduled for the 1938 Summer Meeting of the Society of Automotive Engineers is already running high. F. G. Shoemaker has promised fresh data on the General Motors Diesels; C. G. A. Rosen of Caterpillar Tractor is slated to deliver one of his practical papers on Diesel operation; U. B. Bray of Union Oil Co. of Calif., will talk on Diesel lubrication; and P. M. Heldt of *Automotive Industries* will review recent Diesel progress.

* * * *

One of the attractions that drew the largest crowd in the history of the Metropolitan Section of the SAE to Paterson, N. J., on April 12, was the first public showing of the new universal full-scale single cylinder test engine at the plant of the Wright Aeronautical Corp. This is the engine that was developed by a volunteer SAE Committee with the cooperation of the Waukesha Motor Co.; it is adaptable to work on Diesel cylinders, Diesel fuels, piston-rings, small-bore cylinders, oil testing and development, aviation fuels, and to the addition of various engine accessories. A. W. Pope, Jr., of Waukesha was on hand to demonstrate the engine; later he explained it more fully at the meeting held after the inspection trip.

* * * *

A new tentative method of engine tests for Diesel fuels has been submitted to the Automotive Diesel Fuels Division of the Cooperative Fuel Research Committee by the Institution of Petroleum Technologists. This Institution, like the SAE, is one of the groups cooperating with this Division of the C.F.R. Committee.

* * * *

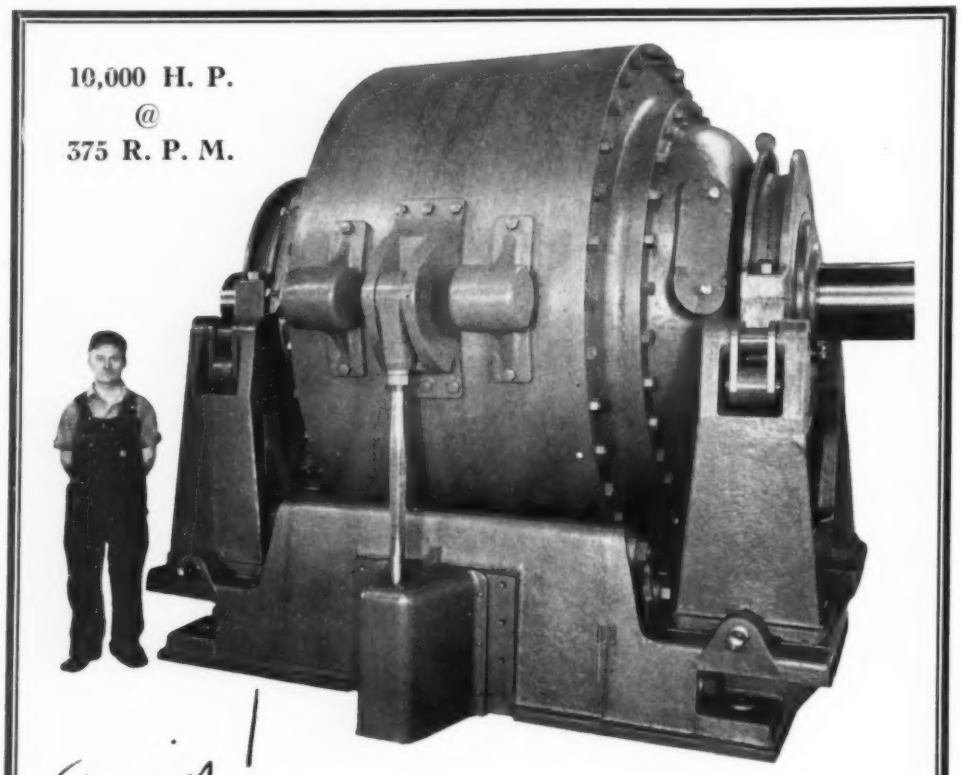
Myron C. Huckle, former chairman of the New England Section of the SAE, has been chosen by Commissioner of Education James G. Reardon to deliver the lectures in the Massachusetts University Extension Courses on Diesel engines. Mr. Huckle is president of the U. S. Diesel Corp.

* * * *

Reflecting a vital and growing interest in Diesel engines, a large party of tractor engineers took advantage of the inspection trip through the Milwaukee plant of the International Harvester Co., a scheduled feature of the SAE National Tractor Meeting, held in Milwaukee, April 14 and 15. Here they saw Diesel engines, Diesel injection equipment, and tractors under construction as guests of L. B. Sperry and John S. Erskine of International Harvester.

* * * *

A similarly interesting inspection trip was made through the tractor plant of the Allis-Chalmers Mfg. Company on Friday morning, April 15th. Mr. C. E. Frudden, the Society's vice-president, was the host for Allis-Chalmers.



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WRIGHT RESIGNS

GUY B. WRIGHT, sales manager of the Buda Company, Harvey, Illinois, and so well-known throughout the Diesel industry, has resigned, and Ralph Mangan has been elected vice-president in charge of sales and advertising of the Buda Company.

In our next issue we hope to be able to announce Mr. Wright's new plans.

QUICKMAIL SERVICE
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PATENT PENDING

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Interested in Diesel driven generators. Details given on my letterhead enclosed.

(1) DIESEL PROGRESS

MR. H. A. ERB
Ridgway Works
Elliott Company
RIDGWAY, PA.

Interested in air filters. Details of my Diesel equipment given on enclosed letterhead.

(2) DIESEL PROGRESS

Mr. W. K. Gregory
American Air Filter Co.
280 CENTRAL AVE.
LOUISVILLE, KY.

Interested in Diesel engines. Details given on my letterhead enclosed.

(3) DIESEL PROGRESS

Mr. R. L. Neiswander
Buckeye Machine Co.
LIMA, OHIO

Interested in having cracked heads welded and exhaust valve seats hard surfaced.

(4) DIESEL PROGRESS

MR. W. P. KENNEDY
Brodie System, Inc.
115 CLIFTON PLACE
BROOKLYN, NEW YORK

Interested in distant-reading tank gauges. Details my Diesel plant on letterhead enclosed.

(5) DIESEL PROGRESS

Mr. T. J. Nedderman
Petrometer Corp.
1 STAR SQUARE
LONG ISLAND CITY, N. Y.

Interested in Diesel engines. Details given on my letterhead enclosed.

(6) DIESEL PROGRESS

Mr. Paris E. Letsinger
Cummins Engine Co.
COLUMBUS, INDIANA

Interested in distant-reading tank gauges. Details my Diesel plant on letterhead enclosed.

(7) DIESEL PROGRESS

Mr. H. C. Cullinan
Liquidometer Corp.
36-16 SKILLMAN AVE.
LONG ISLAND CITY, N. Y.

Details of Diesel engines operated on my letterhead enclosed. Send a field man to see me.

(8) DIESEL PROGRESS

Mr. George N. Elliott
Macmillan
Petroleum Corp.
530 WEST 6th ST.
LOS ANGELES, CALIF.

Interested in Diesel driven generators. Details of requirements appear on my letterhead enclosed.

(9) DIESEL PROGRESS

MR. J. F. SWEENY
DEPT. 7N
Westinghouse
Elec. & Mfg. Co.
EAST PITTSBURGH, PA.

Details of Diesel engines operated appear on my letterhead enclosed. Send me booklet A.

(10) DIESEL PROGRESS

DR. R. B. BURWELL
Alox Corporation
Buffalo Ave. and Iroquois St.
NIAGARA FALLS, N. Y.

Interested in hoisting equipment. Details of Diesel engines operated appear on my letterhead enclosed.

(11) DIESEL PROGRESS

MR. E. J. BYRNE
Chisholm-Moore
Hoist Corp.
TONAWANDA, NEW YORK

Interested in Diesel engine bearings. Details given on my letterhead enclosed.

(12) DIESEL PROGRESS

Mr. Peter Lambertus
American Bearing Corp.
420 NO. HARDING STREET
INDIANAPOLIS, INDIANA

Interested in Diesel engines. Details given on my letterhead enclosed.

(13) DIESEL PROGRESS

MR. CARL BEHN
National Supply Co.
Superior Engine Div.
SPRINGFIELD, OHIO

Interested in Diesel powered yachts 38 ft. and over. Details on my letterhead enclosed.

(14) DIESEL PROGRESS

MR. P. L. SUTPHEN
Port Elco
247 PARK AVE.
NEW YORK CITY

Details of my Diesel plant as requested in your advertisement are given on my letterhead enclosed.

(15) DIESEL PROGRESS

MR. F. L. GERIN
Youngstown Miller Co.
1636 HAYES AVE.
SANDUSKY, OHIO

Interested in pyrometers. Details of Diesel engines operated appear on my letterhead enclosed.

(16) DIESEL PROGRESS

MR. M. D. PUGH
Illinois Testing
Laboratories, Inc.
423 NO. LA SALLE STREET
CHICAGO, ILLINOIS

Interested in Diesel engines 1000-hp. and over. Details on my letterhead enclosed.

(17) DIESEL PROGRESS

MR. J. E. PETERSON
Hooven, Owens, Rentschler Div.
General Machinery Corp.
HAMILTON, OHIO

Interested in Santinal filters. Details of Diesel engines operated on letterhead enclosed.

(18) DIESEL PROGRESS

Mr. O. A. Maunula
Diesel Filter Company
ASTORIA, OREGON

Details of Caterpillar Diesel engines operated on my letterhead enclosed. Send a field man to see me.

(19) DIESEL PROGRESS

Standard Oil Company
of California
Room 1503
225 BUSH STREET
SAN FRANCISCO, CALIF.

Interested in Diesel schools. Information regarding my requirements appear on my letterhead enclosed.

(20) DIESEL PROGRESS

Mr. Ralph Hemphill
Hemphill Diesel Schools
BANK OF AMERICA BLDG.
GLENDALE, CALIFORNIA

Interested in vibration elimination. Details of requirements appear on my letterhead enclosed.

(21) DIESEL PROGRESS

Mr. Sanford Koretsky
The Korfund Company
48-26 32nd PLACE
LONG ISLAND CITY, N. Y.

Interested in intake and exhaust silencers. Details on my letterhead enclosed.

(22) DIESEL PROGRESS

MR. E. A. SIPP
Burgess Battery Company
500 W. HURON ST.
CHICAGO, ILLINOIS

Interested in Maxim silencers. Details of requirements appear on my letterhead enclosed.

(23) DIESEL PROGRESS

MR. FRANK L. ORR
The Maxim Silencer Co.
50 CHURCH ST.
NEW YORK CITY

Interested in PYrometers. Details of Diesel engines operated appear on my letterhead enclosed.

(24) DIESEL PROGRESS

MR. E. F. KINSON
Wheelco Instruments Co.
1933 SO. HALSTED ST.
CHICAGO, ILL.

Interested in all reclamation. Details of engines operated A.C. or D.C. voltage appear on my letterhead enclosed.

(25) DIESEL PROGRESS

Mr. T. A. LaBrecque
The Hilliard Corporation
102 WEST FOURTH ST.
ELMIRA, NEW YORK

Interested in both lube and fuel oil filters. Details on my letterhead enclosed.

(26) DIESEL PROGRESS

WM. W. NUGENT
& CO., Inc.
415 NO. HERMITAGE AVE.
CHICAGO, ILLINOIS

Interested in Diesel engines 750-hp. and over. Details of requirements appear on my letterhead enclosed.

(27) DIESEL PROGRESS

Mr. R. W. Bayerlein
Nordberg Mfg. Co.
MILWAUKEE, WISC.

Interested in super filter. Details of my Diesel plant on letterhead enclosed.

(28) DIESEL PROGRESS

Mr. James H. Skinner
Skinner Purifiers, Inc.
2231 DALZELLE STREET
DETROIT, MICH.

Details of Diesel engines operated on my letterhead enclosed. Send a field man to see me.

(29) DIESEL PROGRESS

MR. G. B. PALMER
Socony-Vacuum Oil
Co., Inc.
26 BROADWAY
NEW YORK CITY

Interested in Diesel engines under 100-hp. Details on my letterhead enclosed.

(30) DIESEL PROGRESS

Mr. Maurice Swan
International Harvester
Co.
180 NO. MICHIGAN AVE.
CHICAGO, ILL.

Interested in crankshaft alignment indicator. Please send full details and quotation.

(31) DIESEL PROGRESS

Mr. Walter Powers
Peet & Powers, Inc.
70 EAST 45th STREET
NEW YORK CITY

Interested in hydraulic dynamometers. Details of my requirements appear on letterhead enclosed.

(32) DIESEL PROGRESS

MR. R. L. KUSS
Taylor Manufacturing
Corp.
2330 WEST CLYBOURN ST.
MILWAUKEE, WISC.

Interested in Diesel engines. Details of requirements appear on my letterhead enclosed.

(33) DIESEL PROGRESS

MR. T. F. HUDGINS
Cooper-Bessemer Corp.
MT. VERNON, OHIO

Interested in lube and fuel purification. Details my Diesel plant on letterhead enclosed.

(34) DIESEL PROGRESS

MR. G. W. CRAMER
Goulds Pumps, Inc.
SENECA FALLS, N. Y.

Interested in Diesel engines. Details of my requirements appear on letterhead enclosed.

(35) DIESEL PROGRESS

Mr. F. H. Kilberry
Atlas Imperial Diesel
Engine Co.
OAKLAND, CALIFORNIA

Details of Diesel engines operated on my letterhead enclosed. Send field man to see me.

(36) DIESEL PROGRESS

MR. H. G. MULLEN
Tide Water Associated
Oil Co.
17 BATTERY PLACE
NEW YORK CITY

Stick this coupon on a postcard or envelope and mail. Please give the advertiser as much information as possible on your present Diesel plant or your requirements, plus your name, position and address. The more data you send them the quicker and better they can serve you.

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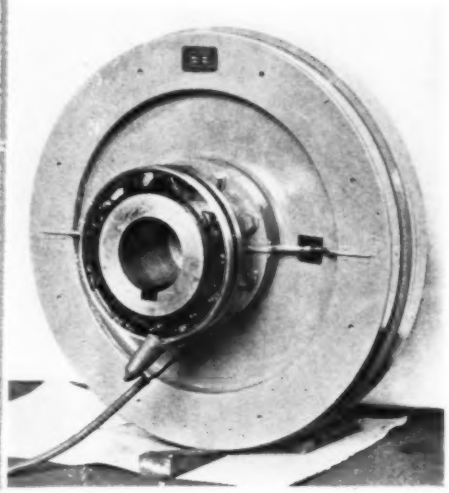
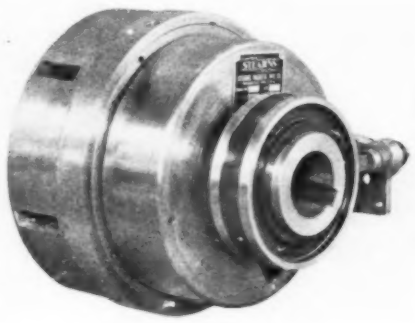
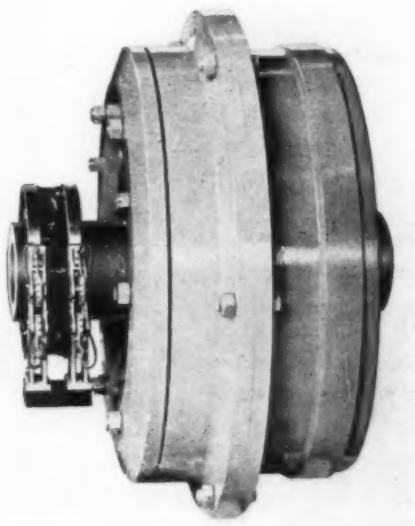
THE "STEARNS" HIGH DUTY MULTIPLE DISC MAGNETIC CLUTCH



Style A Stearns High Duty Single Disc Magnetic Clutch.



Style E Stearns High Duty Multiple Disc Magnetic Clutch.



Style B Stearns High Duty Multiple Disc Magnetic Clutch.

THE "Stearns" High Duty Multiple Disc Magnetic Clutch is essentially a multiple disc friction clutch, actuated by a powerful electro-magnet energized from a source of direct current. There is, however, a marked difference between magnetic clutches and mechanically operated clutches. Wear on the friction discs of the magnetic clutch reduces the air gap through which the magnetic lines of force flow from the field to the armature, increasing the pressure on the discs, and thus increasing the torque transmitted.

Wear on the friction discs, toggles, levers, cranks, pins and shipper devices on mechanical clutches reduces the effective pressure normal to the friction discs thereby decreasing the torque. As the torque of the mechanical clutch is reduced the slippage during the starting period increases, which in turn increases the wear on the clutch linings. Frequent adjustments to compensate for wear are, therefore, necessary. The magnetic clutch as a power transmission unit, possesses many unique features which may not be apparent at first glance. They are made with surprisingly few and simple parts, there being no toggles, pins, shifting collars or yokes, and no auxiliary devices, such as levers, to operate shifting forks. The only parts subject to wear and replacement are the friction linings, and these, being amply proportioned and operating under low unit pressures, will give long and satisfactory service before replacement is necessary.

The advantage of being able to control, through a simple push button, trip or limit switch arrangement, the engagement or disengagement of the magnetic clutch from one or more near or remote points, is one of considerable importance in many installations. The pressure used to engage the friction surfaces being applied magnetically, through the closing of the electrical circuit, eliminates the possibility of ill-use or abuse by a careless operator. Their engagement is always correctly timed, and acceleration occurs gradually, thus protecting gear trains or chains against damage in the transmission of power. For further information write the Editor, DIESEL PROGRESS, 2 W. 45th St., New York, N. Y.

A Spark Arresting Diesel Muffler

with **LOW RESTRICTION**

To eliminate fire hazard with industrial and marine Diesel engines, Burgess has developed the ATP Series Spark Arresting Muffler. This new unit removes carbon particles of all sizes from the exhaust gases, and at the same time muffles exhaust noises. Yet, it has a very low restriction.

Exhaust gases enter from below, are diverted downward, then upward, and out. Carbon particles and sparks are separated out as the gases change direction. Low restriction is made possible by the large passages and the cross flow through the perforations. Both low and high pitched noises are suppressed by the perforated tubes, the reactance chambers, and the spark-arresting chamber.

To reduce exhaust gas temperatures and make doubly sure that all incandescent particles are extinguished, a water spray nozzle can be inserted in the unit. Write for Bulletin 332. Burgess Battery Co., Acoustic Div., Dept. DPR, 500 W. Huron St., Chicago, Ill.

In England—Burgess Products Co., Ltd., Barwell, Leicester.

BURGESS

AIR CLEANERS AND SILENCERS, MUFFLERS, ENGINE HOODS, CAB TREATMENT, QUIET VENTILATION SYSTEMS

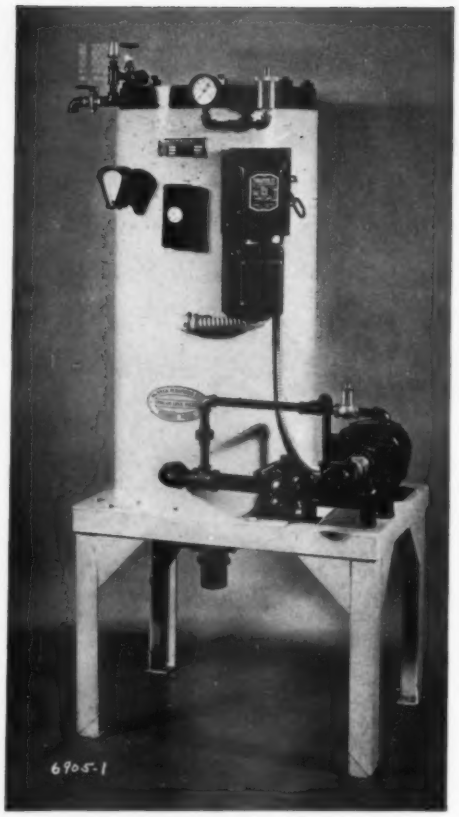
Licensed under C. F. Burgess Laboratories, Inc., Patents

SKINNER SUPER FILTER

THE Skinner Super-Filter claims these advantages:

Positive control of the lubrication conditions in the Diesel engine is procured by constantly removing all the injurious impurities from a certain portion of the lubricating oil in the engine. This gives the same condition as if a certain portion of the lubricating oil were being drained out of the bottom of the oil sump and replaced by new oil, thus keeping the lubricant in such a condition that it gives ideal lubrication at all times, has no tendency to form any sludges and will tend to pick up solids, such as in piston ring grooves, the same as when the oil is new.

This is accomplished by use of the super-filter unit which they claim is the only positive, and the world's finest, mechanical filter.



The Skinner Super Filter

These super-filter units are made of many hundreds of very thin flexible discs pressed closely together without spacers, which remove from the oil passing between these discs all the injurious impurities, including all solid matter and both free and entrained moisture.

With a portion of the crankcase oil continuously flowing through this super-filter the unit is removing as much impurities per hour as is being built up in the lubricant and the oil is continuously in condition to furnish first class lubrication at all times.

The filtering operation is fully automatic and simple. The impurities are stopped at the edge of the filter packs and they are cleaned by merely blowing or reversing flow through the filter packs with compressed air.

The packs last for many months of operation and after blowing back for cleaning give the same quality of filtration as originally.

Units of proper size are available to take care of any sizes of Diesel engine operations and are giving most astounding results in keeping the Diesel engine constantly in first class lubricating condition. For further information use Quickmail Coupon No. 28.

Vibration WAS ELIMINATED in Two Buildings by installing KORFUND VIBRO-DAMPERS in One!

WHEN a slow-speed, horizontal steam engine transmitted vibrations to two separate buildings and a five cylinder Diesel, with obviously greater unbalanced forces, operates in the same engineroom without transmitting any vibrations, it sounds like a case for Mr. Ripley. However, here is the answer in the Chief Engineer's own words:

"The old steam engine, replaced by our new five cylinder Worthington Diesel, transmitted vibration throughout the hospital and to a separate building further down the street due to a 'rimrock' foundation condition. Korfund Vibro-Dampers were installed and no vibration is now transmitted to either building by the new engine."

(Signed) W. R. Billard, Chief Engineer,
Manhattan General Hospital

Regardless of type, size or service, there are Korfund Anti-Vibration Products to fit your Diesel engine. Detailed information is available in an interesting and instructive booklet entitled, **Eliminating Vibration Losses.** Write for your free copy today.

The KORFUND CO., Inc.
48-26 THIRTY-SECOND PLACE
LONG ISLAND CITY, NEW YORK
Use Quickmail Coupon No. 21

KORFUND
VIBRATION
CONTROL

TWO APPOINTMENTS

APPOINTMENT of George T. Mahaney and James D. Platt as eastern and western retail sales managers, respectively, of the Diesel Engine Division, General Motors Sales Corporation, was announced today by William J. Davidson, general sales manager.

George T. Mahaney

The two, whose territories will be divided roughly by an imaginary line extending from Mobile, Ala., northward through Chicago and Milwaukee, will maintain their offices at the headquarters of the new Diesel division in Cleveland.

James D. Platt

DALLAS, JUNE 6TH TO JUNE 9TH

DALLAS, Texas, will be the host for the annual national meeting of the Oil and Gas Power Division of the American Society of Mechanical Engineers from June 6 to June 9. Headquarters will be at the Baker Hotel in Dallas and reservations for hotel space should be sent to Professor H. E. Degler, chairman, Committee on Arrangements, University of Texas, Austin, Texas. Rates for the meeting at the hotel will be as follows: Double (twin beds) room, air-conditioned, $2.50 to $3 each per day. Single room, air-conditioned, $3 to $5 per day, or a flat rate of $21 per person from Monday morning to Thursday afternoon to cover a single or double room, including meals. This complete session rate includes air-conditioned room, meals in private dining rooms, annual banquet, dance, ladies' bridge, tea, and Wednesday afternoon entertainment. An excellent program of papers has been arranged commencing at 10 o'clock on Monday, June 6, and a cordial invitation is extended to the readers of DIESEL PROGRESS to be in Dallas for this important and highly interesting Diesel meeting.

The MODERN DIESEL NEEDS A Hilco OIL RECLAIMER

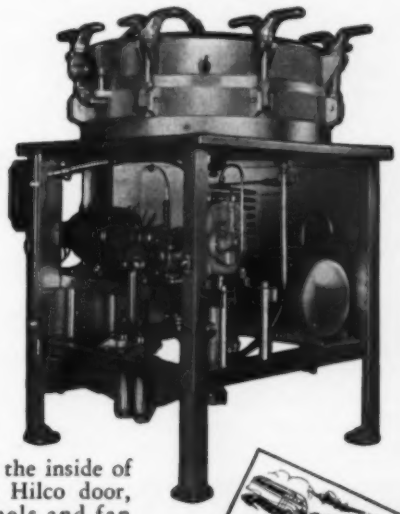
The DIESEL PROVIDES CHEAPER POWER A "HILCO" CUTS COST STILL LOWER *by*

Supplying to your engines at all times an absolutely clear oil free of carbon, sludge, moisture, abrasives, acidity, and fuel dilution.

There is a model having sufficient capacity for every size Diesel installation.

● The HILCO'S Outstanding Features Proven in the Field

- Reduces lubrication costs 50 to 75%.
- Lower Labor Costs per gallon.
- No oil is handled by the operator.
- It will give you color restoration.
- Lower Power Consumption per gallon.
- Requires attention only once in 24 hours.
- Higher percentage of clean oil recovery.
- Continuous, all-electric and automatic in operation.
- Complete restoration of your oil to its original analysis.
- Can be direct-connected to engine lubricating system for continuous or intermittent operation.
- Can be operated as a batch reclaimer where draining lube system is preferred.
- The neat appearance and economical operation of the HILCO is an asset in any plant.



On the inside of the Hilco door, panels and fan guard removed.

Get the facts today . . . in a copy of
OIL RECLAMATION
BY THE HILCO OIL RECLAIMER

WRITE to THE HILLIARD CORPORATION
122 FOURTH ST., ELMIRA, N.Y.

Use Quickmail Coupon No. 25

MAXIM SILENCERS

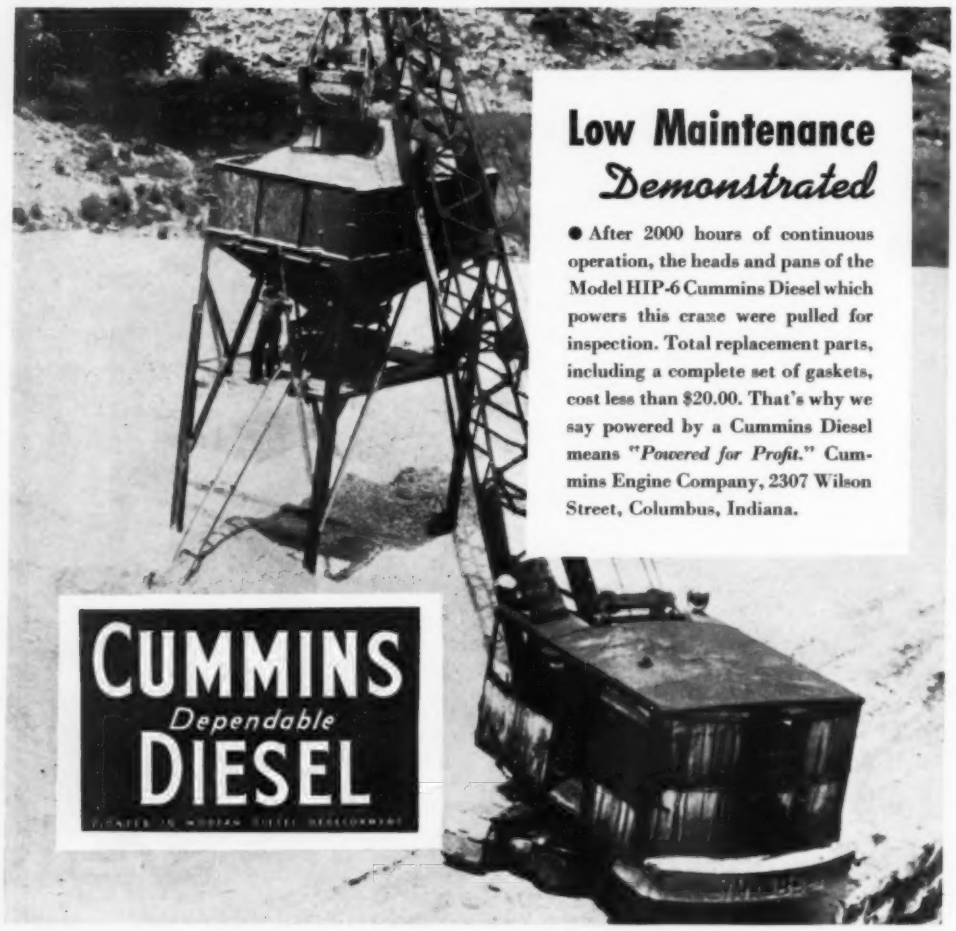
SPARK ARRESTOR TYPE ELIMINATE THE FIRE HAZARD on the "PARATEX"

• Sparks have no place aboard a modern tanker. In keeping with the precautionary measures against fire on the "Paratex", the Alco-Sulzer Diesels are equipped with MAXIM SC2 combination spark arrestors and silencers— 100% assurance against flying sparks and carbon. • Maxim spark arrestors depend not upon one method of trapping sparks, but upon **two**. Gravity and centrifugal force separate **all** the sparks and carbon from the exhaust gas.

For Literature, Use Quickmail Coupon No. 23

THE MAXIM SILENCER COMPANY

HARTFORD, CONNECTICUT **NEW YORK, N. Y.**


Low Maintenance
Demonstrated
● After 2000 hours of continuous operation, the heads and pans of the Model HIP-6 Cummins Diesel which powers this crane were pulled for inspection. Total replacement parts, including a complete set of gaskets, cost less than $20.00. That's why we say powered by a Cummins Diesel means "Powered for Profit." Cummins Engine Company, 2307 Wilson Street, Columbus, Indiana.
CUMMINS
Dependable
DIESEL

DAN HIRTLE, NEW PRESIDENT, BURGESS BATTERY COMPANY

THE Burgess Battery Company has elected Mr. Dan W. Hirtle president and Dr. C. F. Burgess chairman of the board of directors at its annual meeting, held March 26, 1938.

Prior to his association with Burgess, Mr. Hirtle was an assistant superintendent of the American Rolling Mills Company, Middleton, Ohio.

With the Burgess organizations, he became general superintendent of the Freeport Burgess plant and rose rapidly to production manager, later vice-president and now president of the Burgess Battery Company.

This company maintains dry battery factories in Freeport, Illinois, and Niagara Falls, Canada. The Acoustic Division of the company manufactures mufflers, air cleaners, and silencing devices at Madison, Wisconsin. The Arts and Crafts Division is located in Chicago, Illinois. The Burgess Battery Company controls the Thordarson Electric Manufacturing Company, makers of radio and neon transformers, in Chicago, Illinois.

Mr. Hirtle, now residing in Freeport, will move to Chicago, Illinois.

THE bid of the Defoe Boat and Motor Works, Bay City, Michigan, for the construction and equipment of two (2) Coast Guard 110-ft. harbor cutters, sealed bids for which were opened at 2:00 P.M. on March 22, 1938, has been accepted in the sum of $309,440.00 for each of two cutters.

OFFERING an industrial engine for the smaller power user, Caterpillar Tractor Co., Peoria, Illinois, has announced the addition of the Diesel D3400 model to its current line.

The new engine is a four-cylinder model with 3¾-inch bore and 5-inch stroke. It develops 33 horsepower at 1,525 governed rpm. The D3400 engine is generally similar to other "Caterpillar" Diesels, featuring the four-stroke cycle, valve in head, water cooled design, with solid fuel injection into precombustion chambers.

In construction work, the engine is the proper size for powering smaller portable equipment, ⅜-yard draglines and shovels, and smaller industrial locomotives. Connected to a 15 kw. generator, it will provide smooth, even power for all-night service stations, industrial camps, smaller amusement resorts, etc. It is also well suited for irrigation work and other pumping jobs within its capacity.

Unusually simple in design, the D3400 engine contains only three operating adjustments—the valves, water pump and fan. Fuel injection pumps and valves are factory set, and require no adjustment on the job. Seals and air cleaners insure ample protection, regardless of conditions.

For quick, easy starting under all conditions, a 10-horsepower gasoline engine is used. A hot water manifold, on the front of the fuel filter housing, is another all-weather feature. This keeps the fuel oil at the proper temperature, regardless of climatic conditions.

As a power unit, the engine also features a twin radiator, which has been developed by "Caterpillar" engineers. One is for cooling the water, and the other for cooling the lubricating oil, thus assuring longer life for the main engine bearings.

DALLAS IN JUNE – Don't forget the Oil and Gas Power Division of the A. S. M. E. Meeting June 6 to June 9 at the Baker Hotel in Dallas – use the coupon at the right.

CHAIN HOISTS

HOIST EQUIPMENT

MODERN DESIGN — HIGH QUALITY

5 Types of Hand Hoists
3 Types of Electric Hoists
5 Types of I-Beam Trolleys
Many Standard Types of Cranes

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Use Quickmail Coupon No. 11

CHISHOLM-MOORE HOIST CORP.

(Division Columbus-McKinnon Chain Corp.)

6011 FREMONT ● TONAWANDA, N. Y.

Offices: NEW YORK - CHICAGO - CLEVELAND

TRAVELING CRANES

PULLER

ELECTRIC HOISTS

I-BEAM TROLLEYS

LOW HEADROOM HOISTS

COME TO DALLAS FOR THE
1938 ANNUAL MEETING
OF
OIL AND GAS-POWER
ENGINEERS

JUNE
6th
7th
8th
and
9th

MAIL THIS COUPON — WE'LL DO THE RESTI

BAKER HOTEL (*Headquarters*)
DALLAS

Please reserve for arrival on _____ (Date)
at _____ (Time) _____ M.
☐ SINGLE ☐ DOUBLE } Room at $ _____ per day
(Single Rates: $2.50, $3, $3.50, $4; Double: $4, $5 and $6)

Name _____
Address _____
City _____

BAKER HOTEL

DIESEL VIBRATION CONTROL LECTURE AND DEMONSTRATION

EVERYONE in the New York Metropolitan area who is interested in the successful installation and operation of Diesel engines should at once reserve the evening of Wednesday, May 4, for this subject.

At eight o'clock in the evening on that date, a special lecture and demonstration will be given under the auspices of the New York Diesel Institution of New Jersey, located at the corner of Rector Street and McCarter Highway in Newark. The subject of the meeting will be "Vibration Control for Diesel Engines" and the principal speaker will be Mr. S. Rosenzweig, Consulting Engineer for The Korfund Company of Long Island City. Of additional interest is the fact that several of the Diesels in the school laboratories are equipped with Korfund Anti-Vibration Products so that it will be possible to supplement the discussion with first-hand information and observations regarding vibration control under actual operating conditions.

Mr. Rosenzweig expects to cover generally the subject of virbration problems as they affect Diesel operation and will include a sufficient background of theory presented in plain practical terms to give everyone a better and more workable knowledge of this vital problem. There will be no admission charge.

A 3600 HP. ORDER

THE new Dupont Building in Miami, Fla., is to be equipped with a Diesel power plant. An order has just been placed for three 16-cylinder 1200 hp. General Motors Diesels, with generators and full equipment for installation in this big building. This will be the largest building installation in the world.

DIESEL POWER—ENGINES, GENERATOR SETS

840 Hp. Fairbanks-Morse (1)
500 Hp. McIntosh Seymour (2)
450 Hp. Busch-Sulzer (2)
400 Hp. Ingersoll-Rand (2)
360 Hp. Fairbanks-Morse (2)
300 Hp. Fairbanks-Morse (2)
240 Hp. Fairbanks-Morse (2)
240 Hp. Nelseco (8)
180 Hp. Nelseco (1)
180 Hp. Fairbanks-Morse (2)

Complete Plants

150 Hp. Anderson (1)
120 Hp. Anderson (1)
100 Hp. Anderson (3)
75 Hp. Fairbanks-Morse (1)
60 Hp. Worthington (1)
50 Hp. Anderson (1)
50 Hp. Superior-Otto (1)
50 Hp. Int.-Harvester (2)
25 Hp. Fairbanks-Morse (1)
20 Hp. Fairbanks-Morse (2)

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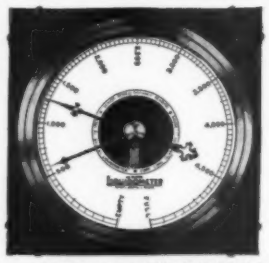

Check your fuel Supply at a Glance!

Write for Bulletin

THE LIQUIDOMETER CORP.
36-24 Skillman Avenue
Long Island City New York

WHY RISK BROKEN CRANKSHAFTS

due to misalignment?

Write for Bulletin No. 7124

● The Ruston Alignment Indicator gives quick, accurate warnings of shaft distortion. It is your best insurance against failure with resultant costly replacement and shutdown charges.

PEET & POWERS, Inc., 70 East 45th St., New York, N.Y.
LISTER AND RUSTON ENGINES

NORDBERG
DIESEL ENGINES

Whatever the size of engine that may be required or if there is a preference of type or design, the extensive line of Nordberg Diesels permits the selection of the proper engine for each individual need. They can be had in sizes from 150 horsepower upward.

NORDBERG MFG. CO.
MILWAUKEE, WIS.

PETROMETER DISTANT READING

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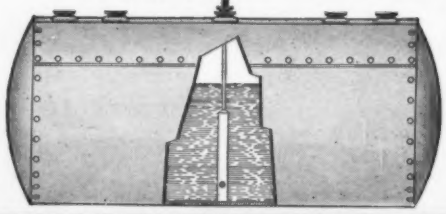

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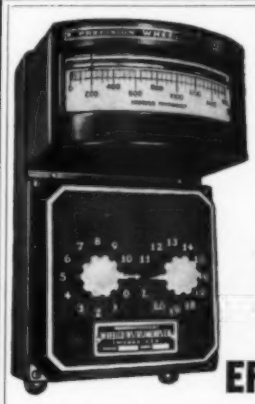

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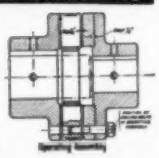

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INDEX OF ADVERTISERS

	PAGE
Alox Corporation	51
Aluminum Co. of America	2
American Air Filter Co.	51
American Bearing Corp.	11
Atlas Imperial Diesel Engine Co.	10
Baker Hotel	49
Brodie System, Inc.	51
Buckeye Machine Co.	1
Burgess Battery Co.	45
Chisholm-Moore Hoist Corp.	49
Cooper-Bessemer Corp.	Fourth Cover
Cummins Engine Company	48
Diesel Dynamics Corp.	51
Diesel Filter Co.	13
Elco Works	51
Elliott Company	Third Cover
Erie Forge Co.	12
General Motors Sales Corp.	5
Goulds Pumps, Inc.	17
Hemphill Diesel Schools	51
Hilliard Corporation, The	47
Hooven, Owens, Rentschler Corp.	15
Illinois Testing Laboratories, Inc.	50
International Harvester Co.	8
Korfund Co., The	46
Liquidometer Corp., The	50
Lovejoy Flexible Coupling Co.	51
Macmillan Petroleum Corp.	14
Maxim Silencer Company, The	48
National Supply Co.	16
Nordberg Mfg. Co.	50
Norma-Hoffmann Bearings Corp.	51
Nugent & Co., Wm. W.	7
Peet & Powers, Inc.	50
Petrometer Corporation	50
Quickmail Coupons	45
Schoonmaker Corp., A. G.	50
Skinner Purifiers, Inc.	4
Socony-Vacuum Oil Corp.	Second Cover
Standard Oil Co. of California	9
Superior Diesels	16
Taylor Manufacturing Corp.	44
Texas Company, The	18
Tide-Water Associated Oil Company	26-27
United American Bosch Corp.	51
Vellumoid Company, The	50
Viking, Instruments, Inc.	51
Westinghouse Elec. & Mfg. Co.	3
Wheelco Instruments Co.	51
Youngstown Miller Co.	6

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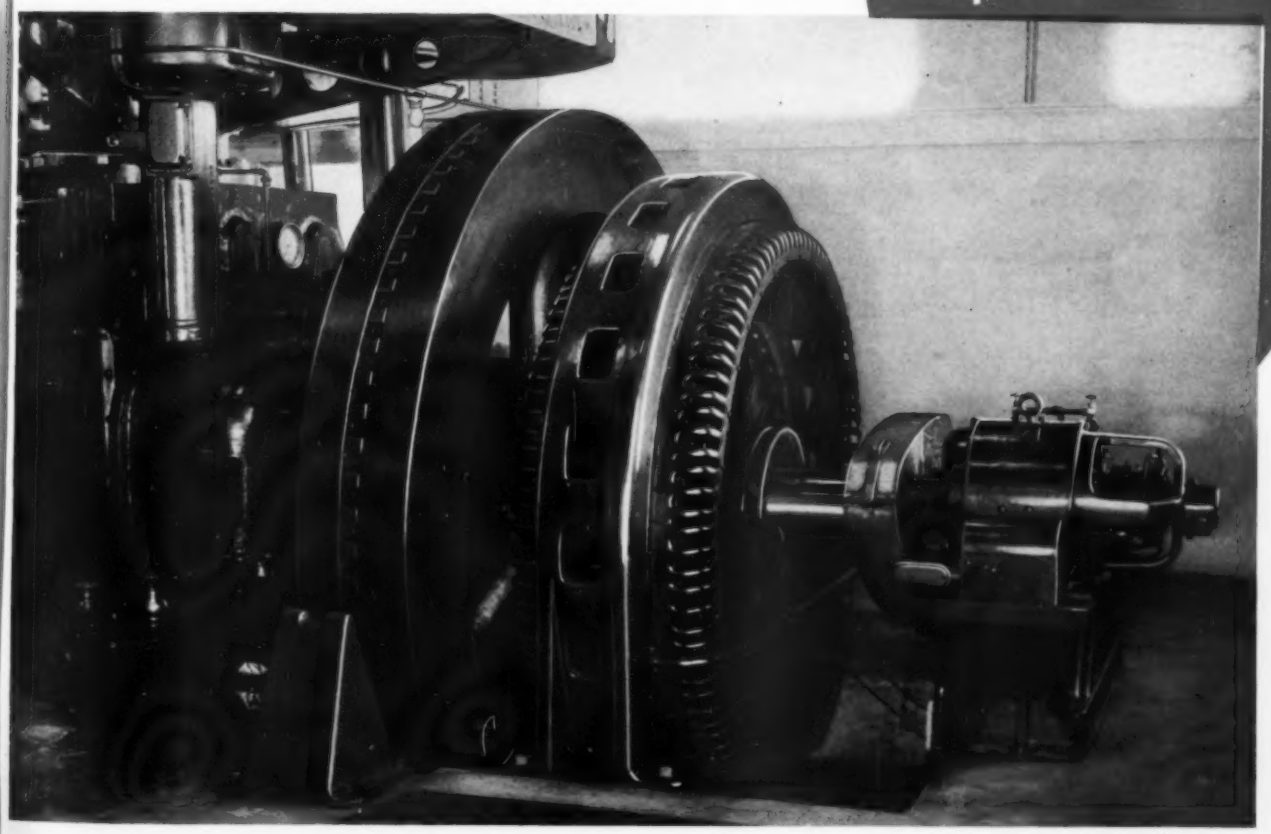

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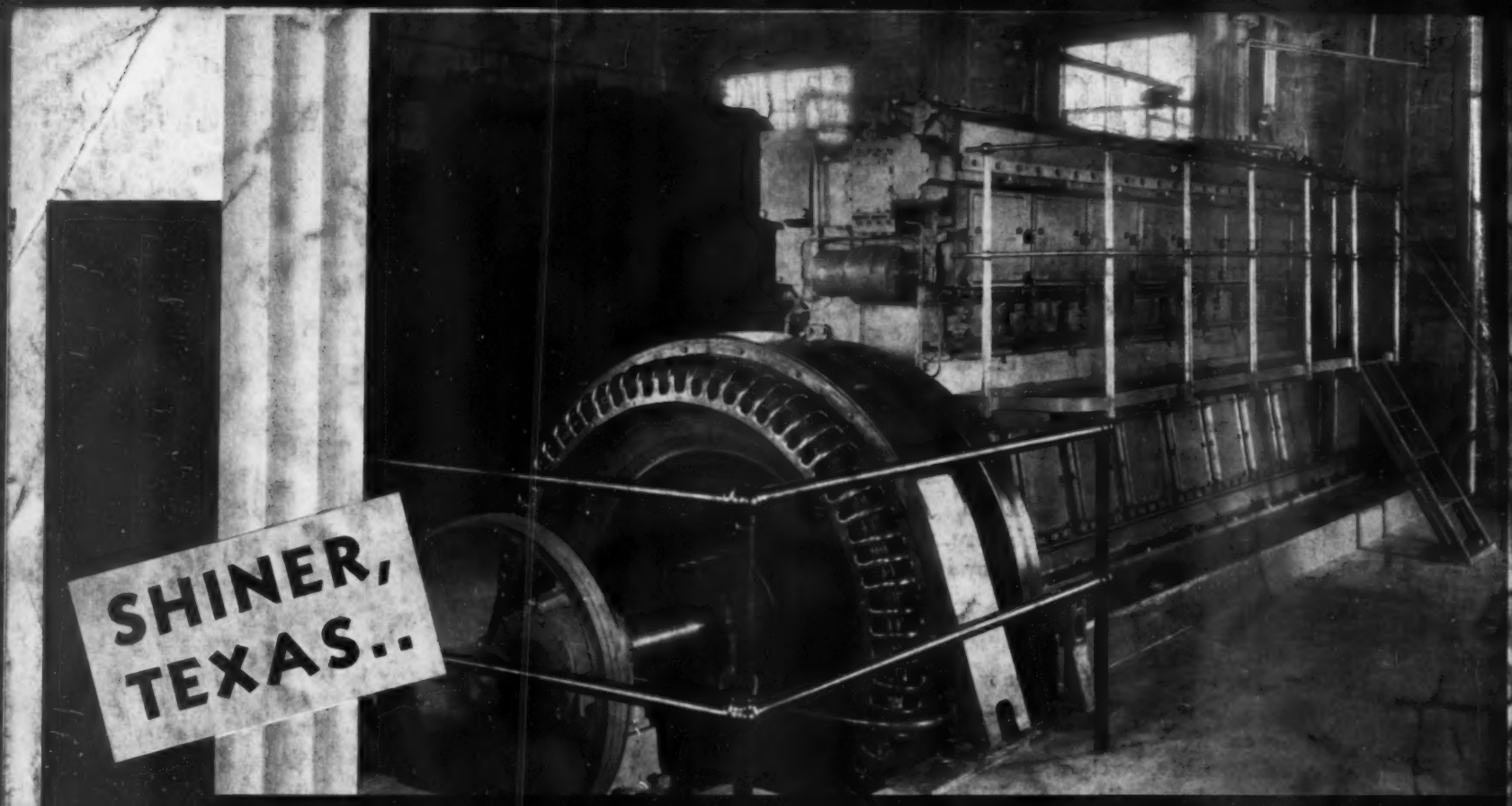

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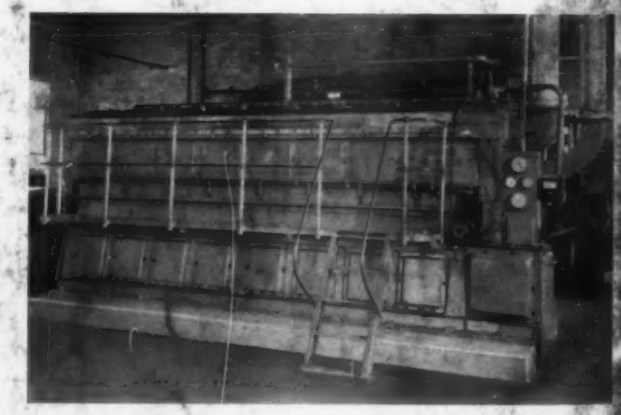

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